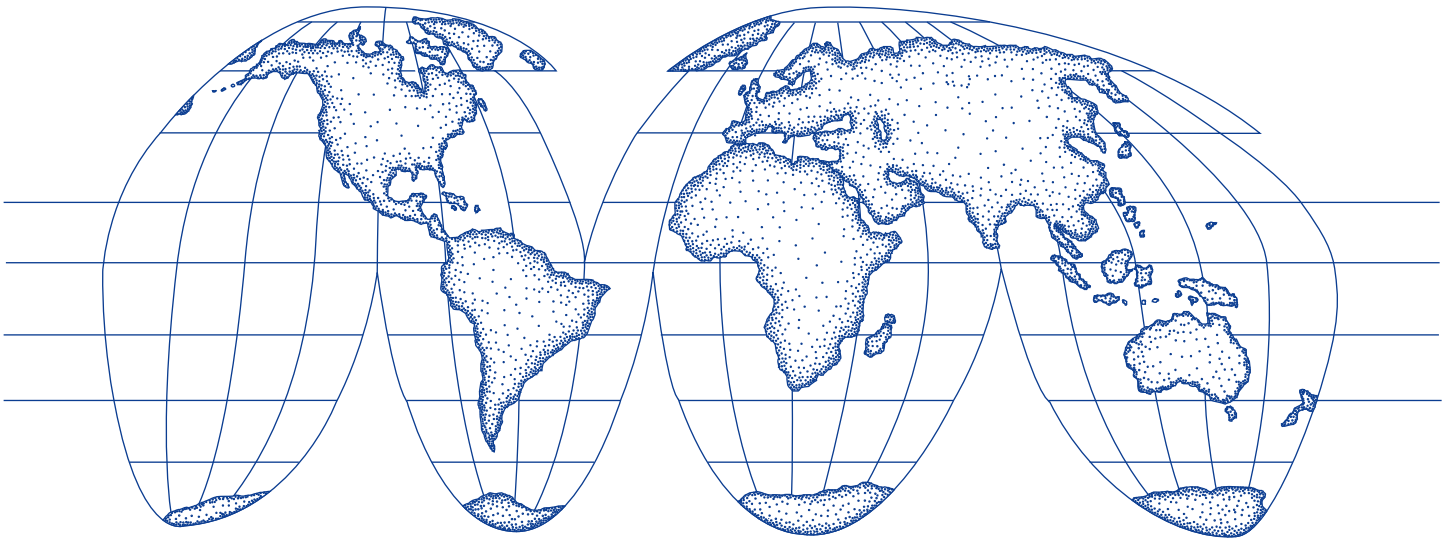
SAFER • HEALTHIER • PEOPLE™

Monitoring the Nation's Health

Proceedings of the International Collaborative Effort on Injury Statistics Volume IV



Paris Meeting
April, 2003

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Health Statistics

Agenda

International Collaborative Effort on Injury Statistics

April 13-14, 2003

Preface

On April 13th and 14th a working group meeting of the ICE on Injury Statistics was held in Paris, France at the Hotel Concorde Lafayette. What follows in these pages is a compilation of papers based on presentations and subsequent discussions during the 2-day meeting.

A key feature of the meeting was the introduction of a 5-year Strategic Plan for the ICE on Injury Statistics. As part of that plan, new statements on the vision, mission and goal of the ICE were accepted.

Vision
There will be injury statistics that are internationally comparable and useful for injury prevention and control.

Mission
The mission of the Injury ICE is to improve international comparability and quality of injury data. The ultimate aim is to provide the data needed to better assess the causes and consequences of injury, differences in injury occurrence over time and place, and the most effective means of prevention and control.

Goal
The goal of the Injury ICE is to provide a forum for international exchange and collaboration among injury researchers who develop and promote international standards in injury data collection and analysis. A secondary goal is to produce products of the highest quality to facilitate the comparability and improved quality of injury data.

As Chair of the ICE, I was primarily responsible for setting the agenda of the Paris meeting and facilitated the sessions. In these Proceedings, each author is responsible for individual presentations, and as such, specific questions should be addressed to the author.

These Proceedings will also be released on the ICE web pages. Detailed information about the ICE including work on specific projects, Proceedings of earlier meetings and lists of publications related to ICE work can be found at the website:
www.cdc.gov/nchs/advice.htm

Lois A. Fingerhut
Chair, ICE on Injury Statistics
Special Assistant for Injury Epidemiology
Office of Analysis, Epidemiology and Health Promotion
National Center for Health Statistics

Acknowledgements

The planning of the meeting and the preparation of these Proceedings were made possible due to the dedicated assistance of my two colleagues at NCHS, Margaret Warner and Melissa Heinen.

Thanks also to NCHS colleagues Sam Notzon, Special Assistant for Global Statistics, Elaine Wood, International Program Coordinator and Pat Drummond, Conference Assistant, for logistical support.

Carla Battle from Courtesy Travel Associates continues to be our successful travel planner and we thank her! In addition, at this meeting in Paris we were fortunate to secure the services of a destination management company led by Maryse Freher at La Fayette Travel.

I also want to thank the NIH, National Institute of Child Health and Human Development for their continued support and sponsorship of the International Collaborative Effort on Injury Statistics.

Participant List
International Collaborative Effort on Injury Statistics
Hotel Concorde La Fayette
Paris, France
April 13-14, 2003

Limor Aharonson-Daniel, Ph.D., B.Sc.
Israeli National Center for Trauma
and Emergency Medicine Research
Gertner Institute
Tel Hashomer, Israel
Tele: 972-3-5354252 ext. 6
Fax: 972-3-5353393
limorad@gertner.health.gov.il

Barbara M. Altman, Ph.D.
Special Assistant for Disability
Office of Analysis, Epidemiology,
and Health Promotion
National Center for Health Statistics
3311 Toledo Road, Room 6111
Hyattsville, MD 20782-2003
Tele: 301-458-4654
Fax: 301-458-4038
baltman@cdc.gov

Malka Avitzour, M.P.H.
School of Public Health
Hadassah Medical Organization and
Hebrew University
IL-91120
Jerusalem, Israel
Tele: 972-2-6778105
Fax: 972-2-6439730
amalka@hadassah.org.il

Anneke Bloemhoff, M.S.
Consumer Safety Institute
P.O. Box 75169
1070 AD Amsterdam, The Netherlands
Tele: 31-20-511-4518
Fax: 31-20-669-2831
a.bloemhoff@consafe.nl

Ruth Brenner, M.D., M.P.H.
National Institute on Child Health
and Human Development, NIH
9000 Rockville Pike, MSC 7510
Building 6100, Room 7B03
Bethesda, MD 20892-7510
Tele: 301-496-5581
Fax: 301-402-2084
brennerr@exchange.nih.gov

Alberto Concha-Eastman, MD, MSc
Regional Advisor on Violence and
Injuries Prevention
PAHO/WHO
525 23rd Street, NW, Room 720
Washington, DC 20037
Tele: 202-974-3890
Fax: 202-974-3331
conchaal@paho.org

Colin Cryer, Ph.D.
Senior Research Fellow, Centre for
Health Services Studies
University of Kent
N211 George Allen Wing, Cornwallis
Canterbury, Kent CT2 7NZ, England
Tele: -1227-827963
Fax: -1227-827868
p.c.cryer@kent.ac.uk

Anne-Marie Feyer, Ph.D.
PO Box Q1150
Queen Victoria Post Office
Sydney, NSW 1230, Australia
Tele: 61-2-9310-3648
Fax:
afeyer@gandalf.otago.ac.nz

Lois A. Fingerhut, M.A.
Special Assistant for Injury
Office of Analysis, Epidemiology,
and Health Promotion
National Center for Health Statistics
3311 Toledo Road, Room 6316
Hyattsville, MD 20782-2003
Tele: 301-458-4213
Fax: 301-458-4038
lfingerhut@cdc.gov

Robert J. Flanagan, Ph.D.
Consultant Biochemist
Medical Toxicology Unit
Guy's and St. Thomas' Hospital Trust
Avonley Road
London SE14 5ER, England
Tele: 44(0) 207-771-5365
Fax: 44(0) 207-771-5363
robert.flanagan@gstt.nhs.uk

Birthe Frimodt-Moller, M.D.
Researcher
Centre for Injury Research
National Institute of Public Health
25 Svanemollevej
DK-2100 Copenhagen, Denmark
Tele: 45-3920-7777 ext. 310
Fax: 45-3927-3095
bfm@niph.dk

Sue S. Gallagher, M.P.H.
Senior Scientist
Children's Safety Network
Education Development Center, Inc.
55 Chapel Street
Newton, MA 02458
Tele: 617-618-2206
Fax: 617-969-9186
sgallagher@edc.org

Clare Griffiths
Senior Research Officer
Office for National Statistics London
1 Drummond Gate
London SW1V 2QQ, England
Tele: 020 7533 5242
Fax: 020 7533 5103
clare.griffiths@ons.gsi.gov.uk

James Harrison, M.B.B.S., M.P.H.
Director and Associate Professor,
AIHW National Injury Surveillance
Research Centre for Injury Studies
Flinders University
Mark Oliphant Building, Laffer Drive
Bedford Park 5042, Australia
Tele: 9011-61-8-8374-0970
Fax: 9011-61-8-8374-0702
james.harrison@flinders.edu.au

Melissa Heinen, M.P.H.
Statistician
Office of Analysis, Epidemiology,
and Health Promotion
National Center for Health Statistics
3311 Toledo Road-Room 6308
Hyattsville, MD 20782-2003
Tele: 301-458-4179
Fax: 301-458-4038
mheinen@cdc.gov

Yvette Holder, M.P.H.
39 Erthig Road Belmont
Port of Spain
Trinidad and Tobago, West Indies
Tele: 1-868-624-1441
Fax:
yvetteholder@aol.com

Lars-Gunnar Horte
Epidemiologist
Center for Safety Promotion
Norrbacka, 1st Floor
SE-171 76 Stockholm, Sweden
Tele: +46 8 517 779 32
Fax: +46 8 517 779 30
lars-gunnar.horte@smd.sll.se

Anne Mette Tranberg Johansen, M.Sc.
Statistician
National Institute of Public Health
25 Svanemollevej
DK-2100 Coopenhagen, Denmark
Tele: 45-3920-7777
Fax: 45-3927-3095
amt@si-folkesundhed.dk

John D. Langley, Ph.D.
Director, Injury Prevention Research
Department of Preventive and Social
University of Otago Medical School
P.O. Box 913
Dunedin, New Zealand
Tele: 9011-64-3-4798511
Fax: 9011-64-3-4798337
john.langley@ipru.otago.ac.nz

Andre L'Hours
Technical Officer, Classification,
Assessment, Surveys, and Terminology
World Health Organization
20 Avenue Appia
1211 Geneva, Switzerland
Tele: 41-22-791-2843
Fax: 41-22-791-4328
lhoursa@who.int

Johan Lund, M.Sc.
Norwegian Safety Forum
P.O. Box 2473, Solli
N-0202 Oslo, Norway
Tele: 47-23-28-4200
Fax: 47-23-48-2211
johan.lund@fnh.mo

Susan G. Mackenize, Ph.D
Senior Epidemiologist, Injury and
Child Maltreatment Section
Health Surveillance and Epidemiology Division
CHHD/PPHB-Health Canada
Building #7, A.L. 0701D
Tunney's Pasture
Ottawa, Ontario K1A 0L2, Canada
Tele: 613-957-4703
Fax: 613-941-9927
susan_mackenzie@hc-sc.gc.ca

Ellen J. MacKenzie, Ph.D.
Professor, Health Policy and Evaluation
Management and Director, Center for
Injury Research and Policy
The Johns Hopkins School of Public
624 North Broadway, Room 554
Baltimore, MD 21205
Tele: 410-614-4025
Fax: 410-614-2797
emackenz@jhsph.edu

Kara McGee, MSPH
Technical Officer
Unintentional Injury
Prevention-Department of Injuries
World Health Organization
20 Avenue appia
CH-1211 Geneva 27, Switzerland
Tele: 41 22 791 1325
Fax: 41 22 791 4332
mcgeek@who.int

Ted R. Miller, Ph.D.
Pacific Institute for Research and Evaluation
11710 Beltsville Drive, Suite 300
Calverton, MD 20705
Tele: 301-755-2727
Fax: 301-755-2799
miller@pire.org

Saakje Mulder, Ph.D., MSc
Research Director
Consumer Safety Institute
P.O. Box 75169
1070 AD Amsterdam, The Netherlands
Tele: 31-20-511-45-57
Fax: 31-20-669-2831
s.mulder@consafe.nl

Eleni Petridou, MD, MPH
Associate Professor of Epidemiology
Department of Hygiene and
Athens University Medical School
75 Mikras Asias Street, PO Box 11527
Athens, Greece
Tele: +30 210 7462187
Fax: +30 210 7773840
epetrid@med.uoa.gr

Cleone Rooney, M.D.
Medical Epidemiologist
SESAG/D&H
Office of National Statistics
1 Drummond Gate, Room B7/04
London SW1V 2QQ, England
Tele: 9011-44-20 7533-5254
Fax: 9011-44-20 7533-5103
cleo.rooney@ons.gov.uk

Mathilde Sector, P.T., M.P.H.
Research Associate
European Child Safety Alliance
Institut Sicher Leben
Vienna, Austria
Tele: 43-1-715-6644321
Fax: 43-1-715-664430
mathilde.sector@sicherleben.at

Maria Segui-Gomez, M.D., Sc.D.
Adjunct Assistant Professor
The Johns Hopkins School of Hygiene
and Public Health
624 North Broadway Street, Room 543
Baltimore, MD 21205-1996
Tele: 410-614-9851
Fax: 410-614-2797
mseguigo@jhsph.edu

Gordon S. Smith, M.D., M.P.H.
Epidemiologist
Liberty Mutual Research Institute for Safety
71 Frankland Road
Hopkinton, MA 01748
Tele: 508 497-0250
Fax: 508-435-8136
gordon.smith@libertymutual.com

Nancy Stout, Ed.D.
Director, Injury Surveillance
Division of Safety Research
National Institute for Occupational
Safety and Health
1095 Chestnut Ridge Road
Morgantown, WV 26505-2888
Tele: 304-285-5894
Fax: 304-285-6047
nstout@cdc.gov

Bertrand Thelot, M.D.
Medical Epidemiologist, Injury
Departement Maladies Chroniques et
Traumatismes
Institut de Veille Sanitaire
12 rue du Val d'Osne
94415 Saint-Maurice cedex, France
Tele: 33-0-141796875
Fax: 33-0-141796811
b.thelot@invs.sante.fr

Emilio Castejon Vilella
Titulado Superior
Instituto Nacional De Seguridad E
Higiene En El Trabajo
C/Dulcet, 2-10
08034 Barcelona, Spain
Tele: 34-932-800-101
Fax: 34-932-803-642
emilioc@mtas.es

Margaret Warner, Ph.D.
Staff Fellow
Office of Analysis, Epidemiology,
and Health Promotion
National Center for Health Statistics
3311 Toledo Road, Room 6325
Hyattsville, MD 20782-2003
Tele: 301-458-4556
Fax: 301-458-4038
mwarner@cdc.gov

Kathryn Wilkins, M.Sc.
Senior Analyst, Health/Vital
Statistics Studies Section
Health Statistics Division
Statistics Canada
Tunney's Pasture, RH Coats Building,
Ottawa, Ontario K1A 0T6, Canada
Tele: 613-951-1769
Fax: 613-951-0792
kathryn.wilkins@statcan.ca

Pnina Zadka, M.S., M.P.H.
Senior Director
Economic Infrastructure Department
State of Israel Central Bureau of Statistics
P.O. Box 34525
Jerusalem 91342, Israel
Tele: 972-2-659-2101
Fax: 972-2-659-2103
pnina@cbs.gov.il

Agenda

International Collaborative Effort on Injury Statistics
April 13-14, 2003
HOTEL CONCORDE LA FAYETTE
PARIS - CHAMPS-ELYSEES
3, place du Général Koenig - 75017 Paris - France
Telephone: (33) 01.40.68.50.68

Sunday, April 13		**Room**
8:00 a.m.	**Registration**	Van Gogh/Pissaro
8:30 a.m.	**Opening Remarks** Lois Fingerhut, Chair, ICE	Van Gogh/Pissaro
9:00 a.m.	**Update from European Commission** – Mathilde Sector	Van Gogh/Pissaro
9:30 a.m.	**Discussion of Definition of Injury** Facilitated by Lois Fingerhut	Van Gogh/Pissaro
10:00 a.m.	**ICECI Update**- Saakje Mulder	Van Gogh/Pissaro
10:30 a.m.	**Break**	
10:45 a.m.	**Workgroups – Progress report presentation**	Van Gogh/Pissaro
10 :45	Injury Indicators – Colin Cryer	
11:05	Selecting a main injury from multiple cause of death– Margaret Warner	
11:25	Household Surveys - Melissa Heinen/Kara McGee	
11:45	Occupational Injury – Nancy Stout/Anne-Marie Feyer	
12:05	Diagnosis Matrix and multiple injury- Limor Aharonson-Daniel	
12:30 p.m.	**Lunch break**	
1:45 p.m.	**Future goals - Update from strategic planning committee** Sue Gallagher, Susan Mackenzie, Birthe Frimodt-Moller, Yvette Holder, James Harrison, and Ruth Brenner	Van Gogh/Pissaro
2:15 p.m.	**Disability Statistics and the Injury ICE** – Barbara Altman	Van Gogh/Pissaro
2:45 p.m.	**Break**	
3:00 p.m.	**Workgroups - Determine focus and workgroup members**	
	Injuries Indicators	Van Gogh/Pissaro
	Selecting a main injury from multiple cause of death	Renoir/Matisse
	Disability	Utrillo/Manet
	Other	Van Gogh/Pissaro
4:00 p.m.	**Workgroups – Determine focus and workgroup members**	

	Household Surveys	Van Gogh/Pissaro
	Occupational Injury	Renoir/Matisse
	Diagnosis Matrix and multiple injury	Utrillo/Manet
	Other	Van Gogh/Pissaro
5:00p.m.	**Plans for day 2**	Van Gogh/Pissaro
5:15 p.m.	**Adjourn**	Van Gogh/Pissaro

Monday, April 14

8:00 a.m.	**Registration**	Van Gogh/Pissaro
8:30 a.m.	**ICE participant updates**	Van Gogh/Pissaro
	ICD-9 to ICD-10 Comparability in E&W – Cleo Rooney	
	EU IPP: Disability & Indicators - Saakje Mulder	
	Nordic Injury Registration - Johan Lund	
	Terrorism – Israel's new classification - Pnina Zadka	
	Poison ICE – Bob Flanagan	
9:30 a.m.	**Workgroups - Plan development**	
	Injury Indicators	Van Gogh/Pissaro
	MCOD/Selecting a main injury	Van Gogh/Pissaro
	Household Surveys	Van Gogh/Pissaro
	Occupational Injury	Van Gogh/Pissaro
	Diagnosis Matrix and multiple injury	Renoir/Matisse
	Disability	Untrillo/Manet
10:45 a.m.	**Break**	
11:00 a.m.	**Discussion of strategic plan**	Van Gogh/Pissaro
12:00 p.m.	**Lunch**	
1:00 p.m.	**Workgroups continue to meet from morning in same room**	
2:15 p.m.	**Workgroups – Presentation of anticipated products/future work**	Van Gogh/Pissaro
2:15	Injury Indicators	
2:35	MCOD/Selecting a main injury	
2:55	Household Surveys	
3:15 p.m.	**Break**	
3:30	Occupational Injury	
3:50	Diagnosis Matrix and multiple injury	
4:10	Disability	
4:30 p.m.	**Wrap up and what are the next steps**	Van Gogh/Pissaro
5:00 p.m.	**Meeting Adjourn**	Van Gogh/Pissaro

Contents

Introduction

Lois A. Fingerhut

The meeting was opened after welcoming participants from Australia, Austria, Canada, Denmark, England, France, Greece, Israel, The Netherlands, New Zealand, Norway, Spain, Sweden, Trinidad and the United States. Participants also represented the European Commission, EUROSTAT, European Consumer Safety Association (ECOSA) the Pan American Health Organization and the World Health Organization.

During the year since the World Injury Conference in May 2002, participants in the Injury ICE continued to work on projects identified during earlier meetings. These subject areas were discussed during full sessions and during breakout sessions during the meeting. The edition of the Injury ICE Proceedings includes a summary of the discussions from each of the following subject areas:

- Development of methodologies for selecting national indicators
- Development of methodologies for selecting a main cause of injury death among multiple causes
- Development of methodologies for the analysis and presentation of multiple (nonfatal) injuries
- Development of a "common" set of injury-related questions that could be used in household surveys across countries
- "What is an injury?" –continuing the discussion
- Occupational injury – ways to expand the ICE workgroup
- Discussions of disability and injury- a potential work for the Injury ICE

In August 2002, as the ICE on Injury Statistics was approaching its 10th year, the nearly 60 current and former ICE participants were asked their thoughts regarding the status of ICE and what future directions ICE should take. The following questions were sent via e-mail and responses were received from about half of the participants:

- What has your role been in ICE? Do you want to increase your level of participation or decrease it? Why?
- What do you think the goals of the ICE on Injury Statistics should be?
- Should the role of ICE be to facilitate specific projects for small groups of interested researchers or to foster larger group activities?
- How should meetings be conducted? As working groups? As symposia? Other ideas? How often should we meet?
- Where would we like to see ourselves going? And how will we know when we have gotten there?
- Who else should be attending the meetings? How should future contacts be developed?
- What should our focus be?
- How do we disseminate what we are doing?

- What type of products should we be developing?
- With respect to the future of ICE, what would you want to see yourself involved in? With whom (categories, not individuals)?
- Other issues that you want to raise?

Based on the responses to these questions, a committee comprised of several ICE participants and chaired by Sue Gallagher was established to draft a strategic plan for the Injury ICE. A draft plan was sent out prior to the April meeting and a significant amount of time was allocated at the meeting for input to the adoption of the draft plan, and to the formation of an ICE steering committee. The plan was adopted and is included in these Proceedings.

Other injury-related international work that transpired during the year included the beginnings of a collaboration between the European Commission's Public Health Program's work on injury and the ICE; discussions at the WHO Classification Center Head's meeting in Brisbane (Fall 2002) on the technical status of the International Classification of External Causes of Injury (ICECI) vis-à-vis the ICD Family of Classifications. Papers from that meeting can be found at http://www.aihw.gov.au/international/who_hoc/index.html. The Pan American Health Organization (PAHO) and the CDC, National Center for Injury Prevention and Control (NCIPC) also initiated work on the development of indicators of violence for countries in Latin America.

The papers that follow are a mark of significant progress for the Injury ICE. Congratulations to all!

What is an injury?

John Langley and Ruth Brenner

Acknowledgements

This paper is based on a presentation made to the International Collaborative Effort on Injury Statistics meeting in Paris 13 -14 April 2003. The authors wish to acknowledge the US CDC/National Center for Health Statistics and the NIH/National Institute for Child Health and Human Development for supporting that meeting. The helpful comments of participants as well as those of David Chalmers are appreciated. The Injury Prevention Research Unit is funded by the Health Research Council of New Zealand and the Accident Compensation Corporation.

Paramount to the study of any disease or phenomenon is the clear definition of the variables of interest. The definition of injury has been fraught with challenges and complexities. Importantly, injuries unlike diseases must be defined simultaneously by the causative event and by the resulting pathology. For example, bruising can occur in the absence of an injury event (e.g. in the case of sepsis or a bleeding disorder) and thus, taken alone, cannot be considered an injury. Similarly there are many events, such as car crashes, which result in no pathology, even if 'victims' are bought to an emergency department for observation. Thus, the theoretical definition of injury must incorporate both cause and outcome. Equally challenging is the operational definition of injury, for example, which diagnoses, codes or combination of codes from the International Classification of Diseases (ICD) [1] define injury. In this paper we discuss strengths and shortcomings in existing theoretical and operational definitions of injury.

Theoretical Definitions

The theoretical definition of injury is problematic since there is no scientific basis for a

distinction between disease and injury [2]. Nevertheless there seems to be consensus in many of the public health orientated injury texts that the "energy definition" best describes the causes and pathologies of interest. That is "injury" refers to damage to the body produced by energy exchanges that have relatively sudden discernible effects [3]. While this seems to be a reasonable starting point, a number of issues remain. These issues are perhaps best explored through specific examples. First, what is meant by "damage to the body". If damage to the body refers to tissue damage, strict adherence to the theoretical definition would lead to the exclusion of many events that are routinely classified as injuries. For example, ingestion of a foreign body, such as a coin, often results in no tissue damage and foreign bodies can be removed from other orifices such as the nose or ear, without damage to the surrounding tissues. Similarly, a sexual assault which results in no tissue damage but from which the victim experiences severe depression, will only be covered by the theoretical definition if the scope of bodily damage is broadened to include psychological damage. There would seem to be a case for such harm to be included in a theoretical definition given that significant numbers of those in injury research and practice consider this a legitimate area of concern for the field. Moreover, in New Zealand (population 4m) at least, the agency, Accident Compensation Corporation, which has the primary mandate for injury prevention, rehabilitation, and compensation, compensates victims who suffer such harm. In the 2000/2001 financial year 267 people were compensated for psychological injury at a total cost $NZ 2,659,000.

Second, consider also the meaning of "energy exchange." Clearly a surgical incision is the result of intentional transfer of mechanical energy and this transfer results in tissue damage, yet, traditionally surgical incisions are not included in counts of intentional injuries. Perhaps, when the benefits of the purposely-intended injury are thought to outweigh the costs, the theoretical

definition is not applicable. But that approach is inconsistent with our approach for counting injury due to the lawful use of force (e.g. police), where presumably the benefits are also thought to outweigh the costs of using such force. In this case, however, provision is made in ICD to code injuries due to this cause (E970-978: Legal intervention).

Most injury prevention experts expand the theoretical definition of injury to include not only bodily damage caused by transfers of energy but also damage caused by the absence of energy [3]. While this serves us well by bringing injuries due to a number of causes (e.g. drowning, hypothermia, and asphyxia) under the broad umbrella of the theoretical definition, it also obscures the boundaries as it could be argued that the final pathway for death of any etiology is ultimately an absence of energy.

Finally, the notion that an injury must have "sudden discernable effects" leads to the exclusion of tissue damage due to chronic low-energy exposures (e.g. carpal tunnel syndrome) but as Robertson has pointed out some have modified the energy definition to include such cases [3].

The development of the theoretical "energy" definition of injury by Haddon represented a significant advance in our thinking and provided a useful basis on which to consider injury control measures [4]. One of its major strengths is the inclusion of both cause and outcome in the definition. However, as the field of injury prevention has advanced it is clear that there is now a need to refine the concepts outlined in this theoretical definition.

Operational Definitions

Arguably the most common operational definitions of injury, although rarely directly stated as

such by most authors, are all those pathologies included in the Injury and Poisoning chapter (XVII) of the ninth revision of the International Classification of Diseases (ICD) or all those events coded to ICD Supplementary External Causes of Injury and Poisoning (commonly referred to as E codes) [1]. The former chapter includes all those pathologies most scientists and members of the public would describe as injury (e.g. fracture, dislocation, open wound). The latter includes all those mechanisms or events, which 'cause' injury (e.g. motor vehicle traffic crash, fall, sharp objects).

Consider first the Injury and Poisoning chapter. The title of the chapter alone raises interesting issues. Many injury researchers and practitioners would consider poisoning to be one of a range of pathologies, which operationally define injury. That being the case why is the chapter named in this manner?

The chapter includes some pathologies that are clearly not injuries. For example: 994 "Effects of other external causes" which includes conditions such as motion sickness, and effects of hunger; 995 "Certain adverse effects not elsewhere classified" which includes conditions such as anaphylactic shock, adverse effect of drugs, and allergic reactions to foods; and 996-999 "Complications of surgical and medical care not elsewhere classified"; The chapter also makes provision for "Effects of foreign bodies entering through orifice" (930-939) yet these classifications do not directly describe pathology and as we have already mentioned many such events do not result in discernable damage to the body (e.g. young child sticks a small toy up his nose). In other words there is no injury. Even allowing for the possibility that injury may have occurred, this range of codes is anomalous as it is inconsistent with our approach to other injuries. For example we do not have a grouping of codes for "effects of motor vehicle crashes".

Rather we require the actual pathology to be coded.

The converse situation also exists within ICD-9, namely that there are conditions which fall outside the 800-999 range but which some would classify as injury. These include musculoskeletal conditions related to the knee and back (717, 718, 724) and certain conditions of the eye (366.2). Some have argued that most of these conditions are chronic and should thus be excluded from an operational definition of injury, presumably on the basis that the theoretical definition of injury should be confined to pathologies that occur suddenly. Assuming one accepts this argument, it raises an interesting question. Are we to assume, for example, that all strains and sprains coded in the range 840-848 have occurred acutely? Given that there are no guidelines in this respect we feel such an assumption would be unwise. In 1999 at the International Collaborative Effort on Injury Statistics meeting in Washington, Pickett sought to identify all injury codes outside chapter XVII [5]. Various recommendations for dealing with these were discussed at the meeting but no consensus was reached.

Some have argued that “Certain adverse effects not elsewhere classified” (995) and “Complications of surgical and medical care, not classified elsewhere” (996-999) are "medical injuries" and should be excluded from the definition of injury. The justification given is that the aetiology is different than other injuries and that these types of injuries require different means of prevention [6]. As has been argued elsewhere [7], neither argument is sufficient ground for exclusion. Rather the decision should be based on whether the injuries meet an accepted theoretical definition of injury. While some would in fact appear not to meet the theoretical “energy” definition, such as 996.0 “Mechanical complication of cardiac device, implant and graft” others almost certainly do, for example 998.2: “Accidental puncture or laceration during a

procedure". Importantly, the inclusion or exclusion of "medical" injuries has dramatic effects on estimates of incidence. For example, in New Zealand in 1998 there were 67,428 public hospital discharges which had injury (800-999) as the primary diagnosis [7], and 17% of these were in the range 995-999.

The ICD injury and poisoning codes do not include psychological injury. Such harm presumably could be covered by the ICD codes for over mental health outcomes (Mental Disorders290-319). In New Zealand cases with psychological injury could potentially be identified by ascertaining injury events using external cause codes and then searching for accompanying codes indicative of a relevant mental disorder. This is possible in New Zealand because hospital discharges for injury events are routinely assigned external cause of injury codes, even if there is no apparent tissue damage. However, external cause codes are not routinely assigned in many other countries and, even when they are assigned, it is not clear that coders routinely document psychological consequences of injury.

The US Injury Surveillance Workgroup of the State and Territorial Injury Prevention Directors Association (STIPDA) have grappled with the above problems and have recently produced the inclusion/ exclusion criteria for identification of injuries from hospital discharge data [8]. A number of issues are worthy of note. First, no explanation is given for the exclusions/inclusions. For example, late effects of injuries, poisonings, toxic effects and other external causes (905-909) are included. This contrasts with the coding practice in New Zealand where the following explanation is given: "Late effects of injury and poisoning (ICD codes 905-909) are no longer entered as principal diagnosis; preference is given to the residual conditions, with the late effects entered as a secondary "diagnosis" (P8) [9]. The approach adopted in New Zealand would appear consistent with the instructions in ICD-9 (P501) although it must be said that those instructions are difficult to interpret [1]. Second, with the exception child maltreatment

syndrome (995.5), most "medical injuries" have been excluded. Third, the working group acknowledges that there may be codes outside the 800-999 range which qualify as injury but until such stage as a consensus can be reached on these codes, they recommend exclusion of these pathologies from injury counts.

Consider now, the supplementary classification of external causes of injury and poisoning. Reliance on external cause of injury codes to operationally define injuries, has led to other problems. Most importantly, these codes can be used to describe events that result in little or no injury. This occurs most often when a person seeks medical care following an event (e.g. a car crash or a fall), but when the event resulted in no injury. Recent work in New Zealand has shown that 26% of all persons discharged from a public hospital, and whose record was assigned an E code, did not have a diagnostic code within the Injury and Poisoning range (800-999) [7]. In ICD-10 the external cause chapter is now titled “Injury and poisoning and certain other consequences of external causes” [10]. This is more descriptive of what has always been included in the chapter.

Consider the case of drowning as an example of the definitional confusion, which arises from the failure to distinguish the pathology of interest from external causes, which may result in that pathology. Typically the term drowning is used to refer to deaths due to asphyxia in liquid. Non-fatal injury outcomes arising from similar processes are often referred to as near drownings. The difficulty here is that the concept of near drownings includes everything from losing your footing in the surf and temporarily losing control of the situation with no detectable pathology right through to major neurological damage as a result of asphyxia. In the latter case should we not be coding the actual pathology - the injury to the brain? In the former case why are we counting

these cases if there is no damage namely we do not after all code “near lacerations or near burns”.

Conclusions

Some have suggested that discussions about what is and what is not an injury is an esoteric exercise of interest only to nosologists and theorists. Using the New Zealand experience, however, this paper has demonstrated that estimates of the incidence of injury can vary substantially depending on one’s operational definition of injury. This has important implications for determining priorities, developing indicators for monitoring trends, and undertaking international comparisons. The International Collaborative effort on Injury Statistics represents an excellent international forum through which to seek international consensus on both the theoretical and operational definition of injury

References

1. World Health Organization, *International Classification of Diseases - 9th Revision*. 1977, World Health Organization: Geneva.
2. Haddon, W., Advances in the Epidemiology of Injuries as a Basis for Public Policy. *Public Health Reports*, 1980. **95**(5): 411 - 421.
3. Robertson, L.S., *Injury Epidemiology*. Second ed. 1998, New York: Oxford University Press. 265.
4. Haddon, W., Energy Damage and the Ten Countermeasure Strategies. *J Trauma*, 1973. **13**(4): 321 - 331.
5. Pickett, D. *Injury Codes outside Chapter 17.* Proceedings of the International Collaborative Effort on Injury Statistics, Volume III, Pg 22-1 - 22-7, Washington DC, June 1999, US Department of Health and Human Services.
6. Smith, G.S., J.A. Langlois, and J.S. Buechner, Methodological issues in using hospital discharge data to determine the incidence of hospitalized injuries. *Am J Epidemiol*, 1991. **134**(10):1146-1158.
7. Langley, J.D., Stephenson, S.C.R., Cryer, P., et al., Traps for the unwary in estimated person based injury incidence. *Inj Prev*, 2002. **8;** 332-337 .
8. Injury Surveillance Workgroup. *Consensus Recommendations for Using Hospital Discharge Data for Injury Surveillance*, State and Territorial Injury Prevention Director Association: Marietta (GA) 2003.
9. New Zealand Health Information Service *Selected Morbidity Data for Publicly Funded Hospitals 1996/97*. Ministry of Health, Wellington, 1999.
10. World Health Organization, *ICD-10 International Statistical Classification of Diseases and Related Health Problems: Volume 1*. 1992, World Health Organization: Geneva. p. 1-1243.

ICE Injury Indicators Group (ICEIInG) - Progress Report, aspirations, goals and strategy development

Colin Cryer

Background

The presentation set the scene for the Injury Indicators workshops that followed. The workshops were aimed at laying the foundations for the development of a strategy for the ICE Injury Indicators Group (ICEIInG). I covered the following:

- some initial background regarding why we are interested in indicators.
- an overview of some of the issues that ICE and ICEIInG have discussed.
- work that has been carried out by ICEIInG members that is relevant to this group – including the validation criteria developed by ICEIInG in Washington in 2001.
- some of the issues that we have identified that could be addressed by the group

I then went on to set the scene for the strategy development and to propose aspirations and goals for ICEIInG for discussion during the workshop groups.

Why the interest?

I started with a quote from the editors of Public Health [1]:

> "Public health systems across the world are being encouraged ... to show evidence of health gain. Defining accurate indicators of such health gain has become a major area for academics and professionals. **Getting such indicators right is essential** since the effectiveness of healthcare systems may be judged using such indicators. Perhaps more importantly, financial resources may flow – or be withheld – on the basis of such indicators"

So if we do not get our indicators right, then financial incentives to address an important injury problem may be inappropriately reduced or withdrawn, and moved to less deserving areas.

Proposed definition

I have failed to find a good definition of an injury indicator from the literature, so I proposed the following:

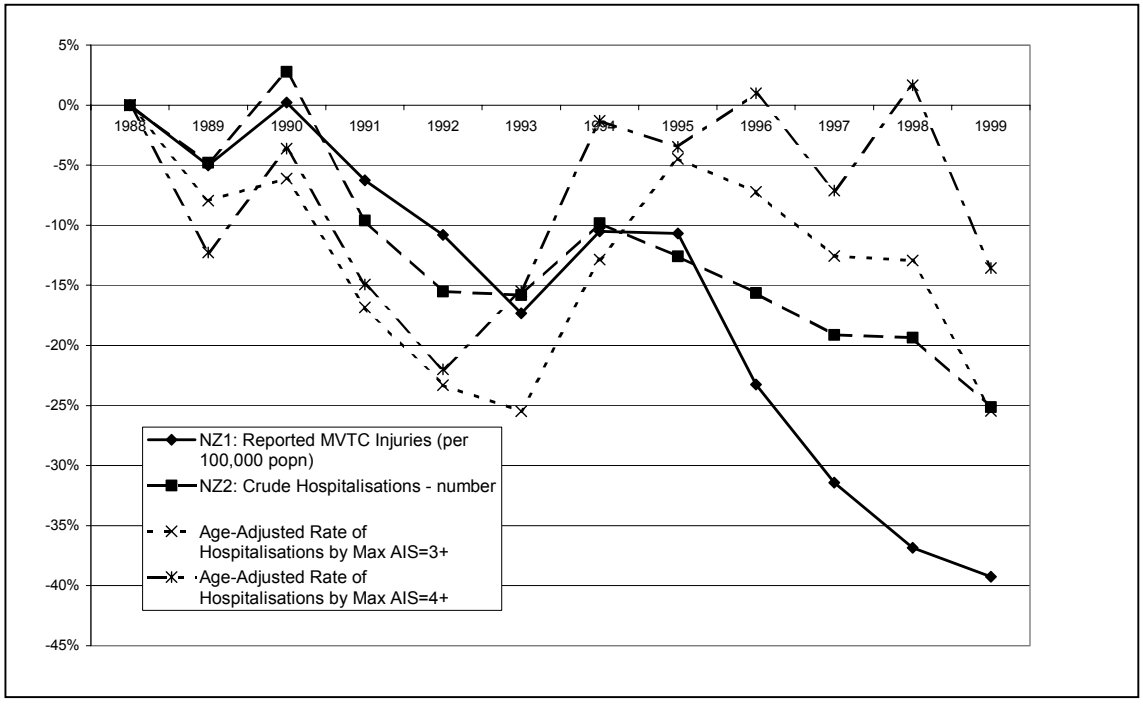
> "An injury indicator is a summary measure which denotes or reflects, directly or indirectly, variations and trends in injuries, or injury-related or injury control-related phenomenon."

Why the concern?

I presented Figure 1 at the last ICE meeting to illustrate why we are concerned to 'get our indicators right'. It showed trends in 4 indicators that are aimed at reflecting the same phenomenon, namely the incidence of injury on the roads. The indicators include two official New Zealand indicators and two produced by the Injury Prevention Research Unit (IPRU) – an academic unit based in Dunedin, New Zealand. They all presented MVTC injuries, but used a variety of measures of MVTC injuries, and showed the percentage change in the indicator from the reference date of 1988.

Governments are interested in knowing whether targets have been met. What this graph illustrated was that different conclusions could have been reached if the indicators produced by the IPRU were used rather than the official indicators. If, for example, the target date was 1996, and the target was a 10% reduction in injuries, then on the basis of the official indicators, the target would have been met. However, if the IPRU indicators had been used in their place, the target would **not** have been met. I suggested that Government would have quite contrasting reactions to these two situations; it could provoke a contrasting response in terms of new policy and investment. So the choice of indicator does matter. (I cannot say definitely which are the best indicators; however, if I apply our validation criteria (see below) to each of these indicators, the suggestion is that the IPRU indicators are more valid.)

Figure 1: Percentage deviation from 1988 base in four New Zealand road safety indicators.



Overview of work

I presented a summary of work by some members of ICEIInG relating to injury indicators and / or their development, starting with where the 2001 ICE meeting got to.

ICE meeting, Washington 2001

Much of the discussion on injury indicators at the 2001 ICE meeting was around getting agreement on criteria for validating injury indicators. Validity can be judged in a number of different ways including content, concurrent, and predictive validity. The criteria that we discussed would be used to judge content validity. What we agreed was that an ideal indicator should:

- Have a case definition based on diagnosis
- Focus on serious injury – however that is defined
- Have, as far as possible, unbiased case ascertainment
- Be derived from data that are representative of the target population
- Be based on existing data systems (or it should be practical to develop new data systems as the basis for the indicator)
- Be fully specified.

For a full statement of the criteria, see Box 1. Many of the above criteria focus solely on indicators of injury incidence, and within that on the characteristics of the incident cases.

Box 1: the criteria to be included in the validation tool for indicators of injury incidence.

1. The indicator should reflect the occurrence of injury satisfying some case definition of anatomical or physiological damage.
2. The indicator should be based on events that are associated with significantly increased risk of impairment, functional limitation, disability or death, decreased quality of life, or increased cost (ie. serious injury).
3. The probability of a case being ascertained should be independent of social, economic, and demographic factors, as well as service supply and access factors.
4. The indicator should be derived from data that are inclusive or representative of the target population that the indicator aims to reflect.
5. It should be possible to use existing data systems, or it should be practical to develop new systems, to provide data for computing the indicator.
6. The indicator should be fully specified to allow calculation to be consistent at any place and at any time.

3-country collaboration

Following the 2001 Washington meeting, a collaborative piece of work between 3 countries (Canada, New Zealand, United Kingdom) was organised [2]. That work included the following objective:

> To investigate whether our content validation criteria show consistency between raters when tested on a class of injury indicators, namely national non-fatal indicators used in setting road safety targets.

We focussed on these indicators because all but one of this group had worked previously with national road safety indicators or with the data on which they are based. Six road safety indicators (2 from each country) were assessed by the 3 raters using our 6 validation criteria. Results were tabulated and inspected for consistency. (Consistency across raters in the assessments was seen to be a desirable quality, just as reliability of a measurement instrument is desirable). Our experience of working with these criteria has led to the identification of some improvements that could be made to the validation criteria and to some of issues, for further consideration.

Australia

In Australia, James Harrison and Malinda Steenkamp carried out a technical review of the then current NHPA injury indicators and data sources. Aspects of this work were presented by Malinda at the last ICE meeting in Montreal. The full report was published last year [3]. Their goal was to identify actions and processes required to deliver improvements in indicators and data sources. In order to get to this point they carried out a situation analysis of indicators and data sources, developed a framework for specification of indicators, identified criteria that indicators of injury incidence should possess, and assessed their current indicator specifications against

these criteria. The criteria that they chose were based on the criteria discussed at the 2001 ICE meeting and were as follows:

1. Case definition should be in terms of specified anatomical or physiological damage.
2. Cases included should be all of those that the indicator aims to reflect, or a well defined sample of them.
3. Probability of case ascertainment should be independent of extraneous factors.

The work of ICEIInG, therefore, is contributing, in at least one country, to work to improve the validity of indicators.

Denmark

In Denmark, work of Birthe Frimodt-Moller, Anne Mette Johansen and Bjarne Laursen resulted in a paper presented at the 6th World Conference last year [4]. The aim of the work was:

> "To investigate non-fatal unintentional injury cases in view of the proposed [ICE] characteristics in order to discuss the issue [of the validity of incidence measures] further."

The work was based on data from the Danish Injury Register, which contains detailed information on all non-fatal injuries that attend 5 hospital A&Es (EDs) for treatment. The 6 ICEIInG criteria were used to assess an indicator (injury incidence rate) derived from this source. Their conclusion included the following: that the ICEIInG validation criteria might be complemented with a tool to measure injury severity in ED treated cases. They state that: "A measure for injury severity – other than death or hospital admission – must be applied, in order to satisfy the criterion for the indicator associating injury with increased risk of impairment, functional limitation, disability, decreased quality of life or increased cost." The use of severity measures and severity thresholds when developing indicators of injury incidence based on service utilisation data will also reduce service utilisation effects.

New Zealand

John Langley and Shaun Stephenson have been very active in New Zealand in addressing problems associated with the definition of robust and valid indicators of injury incidence. Four pieces of work were outlined to give a flavour of a wider portfolio.

(1) Similar validation criteria to those agreed by ICE were applied to indicators based on various sources: A&E, death registrations, hospital inpatients and compensation entitlement claims. This work concluded that "If the objective is to track a nation's overall injury record over time it would be extremely desirable to choose indicators based on deaths, anatomically serious injury, and serious disablement" [5].

(2) In a second study, trends in official indicators were contrasted with trends in selected threat-to-life indicators [6]. The authors concluded that: "Overall the results illustrate that unvalidated indicators can be misleading and flag the need to identify more valid indicators of non-fatal injury incidence which can be applied to large administrative databases".

(3) Trends in hospital admissions as a result of injury are often used as indicators of the trends in the incidence of non-fatal injury events in the population. However, a range of factors other than injury incidence may influence trends in hospitalisations. John and Shaun are currently working on a project to investigate whether trends in traumatic brain injury (TBI) resulting in hospital admission have been influenced by factors other than changes in population incidence of TBI and to estimate the size of the effect of these factors.

(4) When developing indicators of injury incidence based on hospital inpatient data, then a natural consequence of indicator development aimed at satisfying the validity criteria is to focus on serious injury. There is a desire therefore to identify a 'good' severity scoring system that is applicable to routinely collected data. The focus of this work was to compare four injury severity scaling methods in terms of their discrimination and calibration. Those that had the best characteristics were identified [7].

So this work takes things a step further in attempting to identify severity scoring systems that are applicable to very large data sets, and recognises that indicators based on health service data may need to be defined in terms of their injury severity.

UK

The indicator work that we have done in England has focussed around the national public health strategy in the following ways:

• We criticised the definitions of the serious injury indicators used in the draft and final strategy - in both instances, case definition was based on an injured person's use of health services [8 9].

•In the first paper we proposed an interim solution to the problem of finding a valid indicator of serious injury – namely the use of serious long-bone fracture [8], which exhibited good characteristics when judged against the validation criteria (although it does have its limitations).

•McClure criticised our proposal of serious-long bone fracture [10] – in our view for the wrong reasons. We responded to this criticism in our Public Health article: 'Measure for measure' [11], and took the debate further stating:

> "Any new indicator that is developed should be based on an explicit definition of an injury, from which it should be clear which events will be captured by the indicator… For indicators of non-fatal injury occurrence, a case definition that is based on some severity threshold is sensible…" and "…before newly proposed indicators are promulgated, they should have been subjected to formal validation".

•The public health community in the UK have acknowledged the importance of this issue of valid indicators through the editorial in Public Health last year [1].

Coming back to our serious long bone fracture indicator. As a post-script, I have just heard that the English Department of Health are to recommend the use of this as a child health indicator to the Commission for Health Audit and Improvement. If accepted, local health communities will be performance managed on the basis of their rates of serious long bone fracture. Furthermore, the pan-European CHILD project is also including the use of serious long bone fracture as an indicator of child health across Europe.

Issues

I suggested some of the issues that may be encompassed by the strategy include the following:

Issue 1: the further development of the validation criteria

Indicators are developed and used for several different purposes, eg. target setting, monitoring, priority setting, and evaluation. One question is, can we use the same validation criteria for indicators that are used for each type of application, or are the relevant criteria dependent on the application?

Secondly, in developing these criteria, we have focused solely on measures of injury incidence. Should the scope be widened to encompass indicators for the measurement of hazard exposure, or the impact of the introduction of injury control initiatives?

Issue 2: Methods for validating indicators
What methods should we be using to validate existing or developing indicators? If we think that the time trends for a particular indicator present a biased picture, what methods should we use to investigate this?

Issue 3: What implications does this have for our choice of questions in population surveys.
At the last meeting, some of us argued that population surveys aimed at capturing injury incidence should not use questions based on service utilisation. For example, we argued against questions such as: "Of the number of times that you were injured, how many of those times was the injury serious enough that you consulted the medical profession?"

Aspirations and Goals

The following statement of aspirations was suggested for discussion:

Our aspirations are that we develop a strategy for the ICE Injury Indicators Group that has:

- relevance internationally;
- supports national activity;
- supports bids for research funding.

And that our goal (again for discussion) is:

To identify reliable and valid indicators relevant to injury prevention aimed at

- Target setting
- Monitoring
- Surveillance
- Priority setting
- Evaluation
- International information exchange.

Strategy development

What follows was agreed during the workshop sessions.

The aspirations and goals were agreed. The proposed scope of ICEIInG is covered by the following headings:

- Dissemination
- Indicators of Injury Incidence
- Data / coding systems that give an 'unbiased' picture over place, time, culture, demographic group
- Indicator development – implications for data collection
- Dealing with service effects and other biases within large administrative data sets
- Validation of injury indicators
- Making linkages to other groups

Dissemination

The use of the website was seen as a key plank of the ICEIInG strategy. It should be used to present:

- Best practice in indicator specification, based on what we currently know.
- List of goals that we should work towards
- List of projects
    - Published
    - Ongoing (including their strengths and limitations)

On the last of these, John Langley and James Harrison suggested that projects be offered for (near) replication. In so doing, the limits of local data should be made known, and recommendations made of how indicators / methods could be improved. So, to this end, it was suggested that we encourage everyone in ICE to:

1. share their work
2. make links with other groups involved in indicator development and make these known to ICEIInG.

Indicators of Injury Incidence

The following were identified as key in the development of indicators of injury incidence:

- Case definition for numerators based on
    - Threat to life
    - Threat for disablement
    - Severity thresholds
- Denominator data
    - Measures of exposure (including how to capture this information)

Data / coding systems that give an 'unbiased' picture over place, time, culture, demographic group

It was agreed that ICEIInG should not consider the availability and quality of data in its own right, but only as these impact on indicators. Issues that are relevant include:

- Robustness of indicators to changing coding systems over time
- Valid comparisons between countries

The goal is to get a clear picture of the injury problem in terms of, for example, how the problem is changing over time, and differs between country or state.

Indicator development – implications for data collection

Key issues that need to be addressed are:

- Existence of data sources
- Collection and coding of key data

John Langley suggested we need to identify countries who have data that supports the development of valid indicators, as well as what those valid indicators are. Also, that these be made known to countries that do not collect data to support the production of particular valid indicators, in order to persuade policy makers in those countries to influence a change in their collections.

Dealing with service effects and other biases within large administrative data sets

It was agreed that the description of, and if possible the quantification of bias, caused by service effects should be included in the scope, and that the following actions should run from these:

- Alerting people to known effects
- Alerting people to projects to identify (?quantify) biases

An example of the latter is the New Zealand TBI project, referred to earlier under the New Zealand subsection of the 'Overview of work'.

Validation of injury indicators

The further development of methods for the validation of indicators was regarded as important. Examples include:

- Completion of our current work
- Further development of the content validation criteria
- Modification of the validation criteria for application to:
    - Other purposes, eg. priority setting
    - Other types of indicators, eg. Process and impact relating to injury control initiatives

Make linkages to other groups

We should make links with other groups to share successes and to ensure that we complement each others work. This includes, for example, the following projects: ECHI / ECHI-2, and the indicator work being developed as part of the EC Public Health Programme.

Saakje Mulder gave her view of how the EU-based work could interact with that of ICEIInG. She explained that Birthe Frimodt Moller was drafting an umbrella document as the first stage of a bid to the EC for funding. Maria Segui Gomez and Eleni Petridou explained that they are drafting a project proposal that would fit under that umbrella proposal. The projects under the umbrella include those based on mortality, hospital admissions and ED data. Other countries could be included in this work – the limitation is that at least 3 member countries are involved. It was proposed that ICEIInG should offer to be an advisory group for this project. (Since the ICE meeting, Birthe Frimodt Moller has invited Colin Cryer to be a representative of ICEIInG on the Advisory Panel to the EC project, should it be funded.)

Other topics from our discussions

These include:

- Particular focus on hospital data – eg. Do trends in indicators based on hospitalisation reflect trends in incidence
- If indicators of injury incidence are based on severity measures – which severity measure should be used?
- Opportunities of data linkage for indicator development.
- Exploiting longitudinal and / or linked data sets for indicator development:

It was felt that linked data sources, as well as longitudinal sources, should be exploited for the development of indicators. There was discussion of potential data sources for developing threat for disablement measures based on ICD-codes. These include:

- New Zealand ACC claims
- Israel compensation claims – these are also ICD coded
- A US longitudinal study that includes 8000 people ICD coded followed up at 3, 6 and 12 months. At each time, the SF36, FCI and return to work will be measured.
- A Spanish (Navarra) study of injured persons who visit forensic physicians to establish levels of incapacity (and so their right to benefits). At the visit, injured people will be ICD and FCI coded and then will be followed prospectively.

The way forward

John Langley expressed the view that any work to be done needs funding. He indicated that, to date, funding has tended to be from local sources. For example, his work to investigate severity measures was originally funded from NZ sources. He is now extending that work through collaboration with James Harrison, who has persuaded his local (Australian) funders to support this extended work. The case was made on the basis of the local benefits that will accrue. Lois Fingerhut asked that the methodology be put on the ICE website eventually.

The editor of one of the major injury journals had been approached by Susan Mackenzie and asked whether there may be the opportunity to have a regular column in the journal that describes ICE activities. The editor had shown definite interest in having a column on the journal's website, with possible interest in a regular short column in the journal. The editor was more tentative about the latter because of space limitations.

Some questions that arose from these discussions were: How do we get active participation across ICEIInG members? How can we move the ICEIInG work forward; what should be the balance between paid and unpaid activities in moving ICEIInG forward? Some investment in unfunded ICEIInG work is worthwhile since there are benefits in linking our local (national) work to an international group and its agenda.

In order to encourage sharing of relevant information, it is important that the agreed scope of our activities be made clear to ICEIInG members. Following this, ICEIInG members should be encouraged to share relevant work. This should be made available, at least, on the ICE web page.

Maria Segui Gomez identified a potential problem of too much sharing, ie. being overwhelmed with too much material on which one is requested to comment. One possible solution would be to just make approaches to highly selected groups of people. An alternative approach would be for an author to notify others in ICEIInG of work on which comments are wanted in a brief email. Those who are interested could request the paper from the sender.

Funding

It is often more difficult to secure funding when collaboration is wide. An alternative is to work towards the harmonisation of local projects each supported by local funds. We need to convince local funders to fund the work, and reference to ICE can be helpful. There may be the opportunity for synergy between the ICE and EC work, and consultation would take place after the meeting.

Maria Segui Gomez asked about the purpose of the funding for ICEIInG. If it is to fund the liaison and communication roles, then relatively small sums are involved. On the other hand, project funding would involve very large sums. Previous communication and discussion implied that the way of working was for members of ICEIInG to get together to develop and organise funding for specific projects, and to use ICEIInG as a reference group, for comment and approval as an ICE project. For this model, only the communication strategy would need funding.

Next steps?

It seemed that the primary focus of ICEIInG should be communication, and an important next step is to get the wherewithal to support this communication strategy.

Other discussion included the following areas:

- International funding of a study of the injury experience of a number of countries using indicators of injury incidence, whose definition is based on sentinel diagnoses (eg. serious long bone fracture).
- Identification of countries with injury hospitalisation data with diagnostic coding that can push the agenda forward.
- The need for a template for our web page to capture information on relevant projects that are taking place.

References

1. Sim F, Mackie P. Editorial. It were to be wished the flaws were fewer... But the main thing is, does it hold good measure? *Public Health* 2002;116:251.

2. Cryer C, Langley J, Jarvis S, Mackenzie S. Injury indicators: a validation tool. *6th World Conference on Injury Prevention and Control*. Montreal, Canada: University of Montreal, 2002:1107.

3. Harrison J, Steenkamp M. Technical review and documentation of current NHPA injury indicators and data sources. Canberra: Australian Institute of Health and Welfare, 2002.

4. Frimodt-Moller B, Johansen AMT, Laursen B. Characteristics of indicators for occurrence of non-fatal unintentional injury. Discussion on proposed criteria for ideal indicators. *6th World Conference on Injury Prevention and Control*. Montreal, Canada: University of Montreal, 2002.

5. Langley J, Cryer C. Indicators for injury surveillance. *Australasian Epidemiologist* 2000;7.1:5-9.

6. Langley J, Stephenson S, Cryer C. Measuring road safety performance: monitoring trends in non-fatal injury. *AEA 11th Annual Scientific Meeting*. Wellington, New Zealand, 2002.

7. Stephenson SCR, Langley JD, Civil ID. Comparing measures of injury severity for use with large databases. *Journal of Trauma Injury, Infection and Critical Care* 2002;53:326-332.

8. Cryer PC, Jarvis SN, Edwards P, Langley JD. How can we reliably measure the occurrence of non-fatal injury? *International Journal of Consumer and Product Safety* 1999;6(4):183-191.

9. Cryer PC, Jarvis SN, Edwards P, Langley JD. Why the Government was right to change the 'Our Healthier Nation' accidental injury target. *Public Health* 2000;114:232-237.

10. McClure RJ, Peel N, Kassulke D, Neale R. Appropriate indicators for injury control? *Public Health* 2002;116:252-256.

11. Cryer C, Langley JD, Stephenson SCR, Jarvis SN, Edwards P. Measure for measure. The quest for valid indicators of non-fatal injury. *Public Health* 2002;116:257-262.

Selecting a main injury from among the multiple causes of death

Margaret Warner

Background

The multiple causes of death and injury working group has been looking at different methods of analyzing injury-specific multiple cause data. One approach is to analyze all the data and another is to select a main injury. Limor Aharonson-Daniel is working on the former and has developed methods of fully utilizing the Barell matrix by creating injury profiles. This work was presented at this ICE meeting.

There are instances were it may be methodologically wise to select a main injury. For instance, not all countries collect or code multiple injury diagnosis from the death certificate. When comparing data from a country with only a main injury reported, the most appropriate comparison would be to a main injury in the comparison country. Also if the number of injuries of the injuries between the comparison groups differs because of reporting and/or coding rather than the actual trauma to the body, it may be inappropriate to compare all injuries. Also, for tabulation purposes, standard practice in some countries such as England and Wales is to select and analyze a main injury so there is a single unique description of each death.

Selecting a main injury from among the multiple cause data is likely to result in a loss of information about the death. It has been shown repeatedly that as the number of injuries increases, the likelihood of death increases (Baker, 1974; Aharonson-Daniel, 2003). Therefore, analyzing all the data from a death can give a lot more information about the severity of the incident and in many cases, may be the best approach. None-the-less, there remain comparisons where data are imbalanced in the number of injuries recorded and analyzing all data may lead to incorrect conclusions.

After the June 1999 meeting of the ICE on Injury Statistics, Chris Cox and Cleo Rooney compared all multiple cause injury data from four countries – the US, Sweden, Scotland,

and England & Wales (Cox and Rooney, 2000). They presented the results at the World Injury Conference in New Delhi. A copy of the presentation is available upon request. One of the striking findings from that paper was the difference in the number of injuries recorded. On the two extremes were the US with about 50% of the death certificates having more than one injury listed and England & Wales with only about 25% with more than one listed.

ICD Guidelines

The International Classification of Diseases (ICD) manual offers some guidelines for selecting a main injury from among multiple injuries coded. This is found in the section on the "Nature of injury". In ICD-9, the selection is based on a Precedence list that classifies all injury diagnoses into one of seven ranked categories (ICD-9, Volume 1, p. 730, IX. Nature of injury). The injury in the highest ranked category is then chosen as the main injury. The ICD-9 Precedence List was replaced in ICD-10 with less explicit selection guidelines, referred to here as ICD-10 Selection Guidelines (ICD-10, Volume 2, pp. 86-87, 4.2.10 Nature of injury). The guidelines generally indicate to select the injury that initiates the death, similar to the guidelines for selecting the underlying cause of death.

At the ICE meeting in April 2001, the work group decided it was important to compare methods of selecting a main injury. The research was carried out at NCHS by Margaret Warner, Melissa Heinen, Lois Fingerhut, and Chris Cox and presented at the World Injury Conference in Montreal in May 2002. Three methods of selecting a main injury were tested: 1) the first- listed on the death certificate; 2) ICD-9 Precedence list; 3) ICD-10 Selection Guidelines. The main injury selected using the different methods was compared to see how often the same injury was selected using the different methods.

Multiple cause of death data from the United States in 1999 were used for the analysis. A sample of 500 deaths with more than one unique ICD-10 code~~s~~ within S00-S99, T00-T35, T79, T90-T98 with an underlying cause of death of injury was randomly selected.

Little more than chance agreement between the methods was found. This was expected assuming the death certificates are completed correctly as the three methods tested are selecting the injury diagnosis based on different criteria. The first-listed method of selection should be selecting the immediate cause-of-death. The ICD-10 Injury Selection Guidelines should be selecting the initiating cause-of-death. The Precedence List was intended to select the most severe injury. A listing of the pros and cons for the three methods of selection from the presentation is reproduced as Table 1.

Mortality Reference Group

The Mortality Reference Group (MRG) has been discussing the changes to these selection guidelines or several years and the Nature of Injury section in general (Johansson, 1998) and has several concerns about the changes in instructions between ICD-9 and ICD-10. They have requested the assistance of the ICE on Injury on these matters. The MRG was established at the 1997 meeting of the WHO Classification Centre Heads as part of an updating mechanism for the ICD. Members of the MRG decide on applications and interpretation of the ICD to mortality and recommend updates to Update Reference Committee (URC). The URC is a separate advisory body to the WHO Secretariat and the Center Heads. A memo on the MRG's issues with the section on the nature of injury and recommended changes is available upon request. The following are the MRG's key concerns with the section:

1. loss of detail when specific injuries are grouped into a broad "multiple injury" title, particularly when some of the specific injuries reflect minor injuries
2. lack of instruction on coding simultaneous injuries such as might be incurred in traffic incidents
3. lack of instruction on what to do when injures are reported in both Part I and Part II of the death certificate
4. confusion about intent of instructions

Item 1 refers to the following instruction in ICD-10 4.2.10.

When more than one body region is involved, coding should be made to the relevant category of Injuries involving multiple body regions (T00-T06). This applies both to the same type of injury and to more than one kind of injury to different body regions.

Table 2 includes examples from Cleo Rooney in England of the application of the guidelines. The examples are particularly troubling as much of the detail of the individual codes is lost. For instance, if there is a head injury (S09.9) and neck injury (S19.9), this rule instructs that the main injury should be *Other specified injuries involving multiple body regions* (T06.8). According to Andre L'hours of the World Health Organization who was participating at the ICE on Injury meeting in Paris, the rationale behind the creation of the rule was so the valuable information about the multiple injuries involved in the death was not lost when selecting a main injury. The rationale is sound however, in practice, the multiple injury codes (T-codes) are very non-specific. Mr. L'hours concurred with this upon seeing examples from a real world application. He did state however, his concern over losing the data on multiple injuries if a main injury is selected from one of the listed causes. The Mortality Reference Group draft memo with the recommended updates proposes eliminating this rule.

Prior to the ICE on Injury meeting, Lois Fingerhut and Margaret Warner as well as Cleo Rooney (as a representative of both the MRG and the ICE on Injury) met with selected MRG members to discuss the main injury selection rules and the draft MRG memo. Based on that meeting the following recommendations for selecting a main injury were drafted (although clearly not yet in ICD parlance):

1) Eliminate trivial and superficial injuries from consideration of selection
2) If there is an obvious causal sequence, then choose the injury which led to the death
3) Select from among remaining injuries using the precedence list
4) Select first mentioned if there are several injuries at the same level of precedence

The MRG agreed to draft the recommendations into proper rules. They also agreed to develop a list of the trivial and superficial injuries. The MRG wants input from the ICE

on Injury on drafting a Precedence List similar to the ICD-9 list for ICD-10. Based on the study of the three selection methods using US multiple cause data, Margaret Warner suggested that some consideration be given to the possibility of eliminating from selection any non-specific codes if more specific codes apply. It was suggested that these might be eliminated based on the Precedence List so a specific rule may not be needed. It was agreed that the new rules should be tested before they are implemented to test this and other assumptions.

Working groups plan

In Paris, the ICE on injury working group agreed in principle with the MRG's recommendations. However, the working group felt that it was important to consider options to keep the information about multiple injuries since we know that two injuries are more severe then one. The working group therefore proposed that we gather more detail about common combinations of injuries from multiple countries.

Action item 1) Determine if common combinations of injuries account for large proportions of injury deaths and to determine if the common combinations differed by country. The method of exploration is an international comparison of multiple cause data. Jamaica, Israel, Australia, US, and England & Wales agreed to supply data. All multiple cause data from the countries will be analyzed and then stratified by the number of injuries to determine if there are common combinations of single codes. If common combinations between countries do exist, they may be recommended as T-codes and will at least be useful in understanding the loss of data by selecting a single injury.

The ICE on injury working group decided that it would be possible to draft a precedence list. The origin of the ICD-9 Precedence List is unknown at this point, but has always been assumed to be a ranking of severity. After discussing the ICD-9 Precedence List (which has 7 levels) and then comparing it to other severity rankings using the combined expertise in the working group, it was decided that the ranking was based largely on body region. The Anatomic Profile was suggested as having many of the attributes that the

group agreed that the Precedence List should have and it was suggested that the Anatomic Profile be used as a basis for the Precedence List (Copes, 1990).

The Anatomic Profile is an empirically derived grouping of body regions containing the most serious injuries. It divides the body into 4 regions – A. head/brain and spinal cord, B. Thoracic and Front of neck, C. Abdomen and pelvis, spine without cord, pelvic fracture, femoral artery, crush above knee, popliteal artery; D. Face and all other regions. These are ranked in order of severity based on the probability of death from the Multiple Trauma Outcome Study (Copes, 1990). There are currently ICD-9-CM codes associated with each group.

Action item 2) Draft ICD-10 Precedence List. The Anatomic Profile (AP) will be looked at as a possible basis for the Precedence List. The ICD-9-CM codes of the AP will be translated to ICD-10 using the WHO Translator and using the results from the US ICD-9 to ICD-10 Comparability Study. The translation will be reviewed for consistency between the ICD versions and the clinical modifications and looked at in detail. Depending on availability this may be compared to the AIS-2003 translated to ICD-10.

Action item 3) Trivial and superficial list – MRG has agreed to come up with the list of trivial and superficial injuries. The working group will supply the MRG with the ICD-10 codes that are AIS 1. We would like to provide the MRG with AIS-2003 codes mapped to ICD-10 if available. However, if they are unavailable as a very rough guide we will supply a rough list mapped from AIS-90 to ICD-9-CM using ICDMAP and then translated from ICD-9-CM to ICD-10 using the WHO Translator ICD9 to ICD10. This will be circulated to the MRG to compare to their list.

All agreed that other international experts in injury related research should validate the lists.

Action item 4) The working group will circulate the Lists to medical examiners and trauma surgeons and other researchers in their and other countries to review.

All agreed that testing the selection rules as developed by the MRG with the Precedence List and Trivial and Superficial List on real world data was sensible.

Action item 5) The working group agreed that the rules should be tested using a sample of data from a variety of countries.

Conclusions

Selecting a main injury from the multiple causes is necessary for international injury comparisons in certain circumstances. For instance, some countries only code a main injury and when comparing to such country, a main injury should be selected from among the multiple injuries using the same methods. The ICD has rules for selecting a main injury when the data are ICD coded. The selection rules changed between ICD-9 and ICD-10. The Mortality Reference Group has some issues with these new rules and the ICE on Injury working group on multiple cause data has agreed to assist the MRG with the recommending changes to the rules by providing a Precedence List. The ICE on Injury Statistics believes it is important not to lose data about multiple injuries so the working group will look at multiple cause data from several countries to determine if common combinations of injuries exist.

References:

Aharonson-Daniel L, Boyko V, Ziv A, Avitzour M, Peleg K. A new approach to the analysis of multiple injuries using data from a national trauma registry. Inj Prev. 2003 Jun;9(2):156-62.

Baker SP, O'Neill B, Haddon W, & Long W (1974). The Injury Severity Score: A method for describing patients with multiple injuries and evaluating emergency care. *J Trauma*, 14: 187-196.

Cox C, Rooney C, Fingerhut L. What can multiple cause of death analyses tell us about patterns and comparability of injury mortality from a variety of countries? 5th World Injury Conference, New Delhi, India. March 8, 2000.

Copes WS, Champion HR, Sacco WJ, Lawnick MM, Gann DS, Gennarellli T, MacKenzie EJ, Schwaitzberg S. (1990). Progress in characterizing anatomic injury. J Trauma, 30(10): 1200-1207.

Johannson LA. (1998). Coding multiple injuries as the underlying cause of death. Paper from the Meeting of Heads of WHO Collaborating Centres for the Classification of Diseases. Paris, France 13-19 October 1998.

Warner M, Heinen MA, Fingerhut LA, Cox CS. Selecting a Main Injury Diagnosis in the Multiple Cause-of-Death File, United States 1999. 6th World Injury Conference, Montreal, Canada. May, 2002.

World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death, Based on the Recommendations of the Ninth Revision Conference, 1975, Geneva: World Health Organization, 1977. Volume 1, p. 730, IX. Nature of injury

World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization, 1992, Volume II, pp. 86-87, 4.2.10 Nature of injury

World Health Organization, WHO Translator for ICD-9 to ICD-10.

Table 1. A comparison of the ICD-9 and ICD-10 methods of selecting a main injury

ICD-9 Precedence list (ICD-9, Volume 1, p. 730, IX. Nature of injury)

Pros

- Can be consistently applied

Con

-Assumption about the order of severity has not been tested. For instance, "multiple injuries" (get code) are in the last ranked category but may be the most severe.

- Does not include poisonings by drugs, medicaments, and biological substances (T36-T50), toxic effects of substances chiefly non medicinal as to source (T51-T65), other and unspecified effects of external causes (T66-T78) and complications of surgical and medical care, not elsewhere classified (T80-T78).

-The order the injury appears on the death certificate plays a major role in the injury diagnosis selected. When using the Precedence List approximately 30 percent of the sample deaths had more than one injury listed in the top ranking category, thus for lack of direction from the ICD-9, the first listed diagnosis in top ranking category of the Precedence List was chosen.

ICD-10 Injury Selection Guidelines (ICD-10, Volume 2, pp. 86-87)

PROS:

-WHO endorses this approach.

-Some countries are currently using this method, such as England and Wales.

CONS:

-For some causes, the injury sequence is inherent. For other causes the injuries occur simultaneously, and this selection method is less appropriate.

-Rules may not be applied consistently.

-The order the injury appears on the death certificate plays a major role in the injury diagnosis selected.

First Listed Diagnosis

PRO:

- Easy to use

CONS:

- Assumes death certificates were filled out correctly and that the first listed is truly the *immediate cause-of-death*.
- The death certificates are known to be filled out inconsistently, which results in misclassification.

Table 2. Multiple injury problem: EXAMPLES OF DEATH CERTIFICATES AND MAIN INJURY SELECTED FOLLOWING THE ICD-10 MAIN INJURY SELECTION RULE (SHOWN BELOW). PROVIDED BY CLEO ROONEY AND BRENDA SMITH FROM ENGLAND & WALES

FROM ICD-10, volume 2, section 4.2.10 Nature of injury, pp. 86-87

"When more than one kind of injury to a single body in S00-S99, T08-T35, T66-T79 is mentioned and there is no clear indication as to which caused death, the General Principle and the Selection Rules should be applied in the normal way."

Examples with the secondary cause as T068
T068 = Other specified injuries involving multiple body regions

Example 1

1a	Head and Neck Injuries	S099	S199
	Fall at Home	W190	
	Verdict = Accidental		
	u/cause = W190	Secondary cause = T068	

Example 2

1a	Head Injury and Fracture thoracic spine	S099	S220
	Fall downstairs at home	W100	
	Verdict = Accidental		
	u/cause = W100	Secondary cause = T068	

Example 3

1a	Spinal cord transection	S141
1b	Atlanto-axial fracture	S121
1c	Head injury	S099
	Fell from a ladder at home	W110
	Verdict = Accidental	
	u/cause = W110	Secondary cause = T068

Example 4

1a	Fracture of skull	S029
1b	multiple injuries	T07

Motor cyclist fell from his bike when he lost control negotiating bend V284

Verdict = Accidental

u/cause = V284 Secondary cause = T068

Examples of secondary cause of S297 – injuries classifiable to more than one of the categories S20-S290
S297 = Multiple injuries of the thorax

Example 1

1a	Hemothorax and pneumothorax	S271,S270
1b	Fracture of ribs	S224

Pedestrian hit by car whilst crossing the road V031

Verdict = Accidental

u/cause = V031 Secondary cause = S297

Example 2

1a	Laceration of Heart , Lung and Aorta	S269,S273,S250
1b	Severe Chest injury	S299

Pedestrian knocked down by a car V031

Verdict = Accidental

u/cause = V031 Secondary cause= S297

Example of an injury in S06- excluding with mention S02-

Example 1

1a	Cerebral contusion, subarachnoid hemorrhage	S062, S066
1b	Fracture of skull	S029

Driver of car in collision with another car

Verdict = Accidental

u/cause = V435 Secondary cause = S029

Example of combining fractures of multiple body regions
T028 = Fractures involving other combinations of body regions

Example 1

1a	Fracture skull, spine and ribs	S029, T08, S224

Pedestrian hit by car V031

Verdict = accidental

u/cause = V031 Secondary cause = T028

Household Injury Survey Comparison

Melissa Heinen and Kara McGee

Background

Household surveys offer population-based injury and poisoning estimates that are not subject to the same biases as medical records-based estimates. Development of reliable methods for conducting household surveys to measure injuries is a priority in many countries in part due to increased interest in international comparisons and in part due to the importance of developing national benchmarks. Household and community-based injury surveys are particularly useful in low- and middle-income countries where other injury surveillance methods are nonexistent or incomplete.

Problem

Currently there is no consensus on the questions or the inclusion criteria for these surveys. The lack of standardized survey questions and methods make international comparisons of non-fatal injuries difficult. The International Collaborative Effort on Injury Statistics (Injury ICE) is providing a forum for the development of a standard methodology for conducting household and community-based injury surveys.

WHO

The World Health Organization Department of Injuries and Violence Prevention (WHO-VIP) is conducting a number of activities related to community-based and household injury surveys. WHO-VIP provides technical assistance and financial support to members states to conduct injury surveys. Currently, WHO-VIP is supporting surveys in Sri Lanka, Kenya, and Mozambique. In addition, WHO-VIP participates in other WHO initiatives related to household surveys, including: the population-based Behavioral Risk Factor Surveillance Project, the STEPwise approach to non-communicable disease surveillance, the Global School-based Health Surveillance System Project, and the WHO Multi-country Study on Women's Health and Domestic Violence.

WHO-VIP is also developing a document, *Guidelines for the community surveys on injuries.* This document is designed to provide the reader with information on the process of designing and implementing a community-based injury survey as well as a standardized survey tool for systematic collection of data. A first draft of this document is currently being revised and will be sent for external review shortly.

Survey comparison

A convenience sample of 10 national household surveys was compared. The countries were selected from among the Injury ICE participants. Survey design elements compared included sample design, recall period, severity threshold, self/proxy reporting, collection method, and questions screening for injuries (table 1). The recall period, severity threshold, screen introduction, and screen question were the focus of the comparison.

Recall periods ranged from 4 weeks to 18 months. The severity threshold for inclusion included no severity threshold, first aid, limitation of daily activities, medical advice or treatment. Some surveys allowed self and proxy reporting while others allowed only self-reporting of injuries. Some of the items included in the section introduction include the definition of injury, definition of intent, explanation of exclusion criteria, explanation of severity threshold, explanation of why the information is collected, and examples of injury conditions or events. Each survey had its own unique set of questions to screen for injuries. The screen questions varied in their wording, recall period, severity threshold, mention of injury examples, and mention of exclusion criteria.

Group discussion

Kara McGee, Johan Lund, Saakje Mulder, Alberto Concho-Eastman, Pnina Zadka, Clare Griffith, and Melissa Heinen shared their countries/organizations experience related to household surveys with injury questions and what they would like to see developed related to household surveys. The general themes from the discussion were:

1. Many organizations are developing their own set of injury questions, thus resulting in a lot of duplication of effort without much comparability at the national or community level. Therefore, there is a need to develop and

recommend a standard set of injury survey questions that can be used at the national and community level.

2. Special attention needs to be paid to severity threshold, cultural components, and recall period. Rationale for the decisions related to these survey components must be well documented.
3. There is a need to develop question modules related to disability, impairment, protective equipment, exposure levels (e.g., number of hours playing sports), risk factors, occupational-related injuries, violence-related injuries (i.e., domestic violence), and special populations (e.g., youth, elderly, etc.).
4. Focus of the ICE group work will not be on methods, because WHO has a done a lot already in this area and often injury questions are imbedded in surveys with previously designed sampling methods.

Plan development

Kara McGee, Sue Gallagher, Kathryn Wilkins, Mathilde Sector, Barbara Altman, and Melissa Heinen met to develop a plan related to household survey injury questions. A measurable objective was defined: *Develop internationally comparable household survey injury modules to collect population based injury data at the national and community level.* The first step in the process will be to expand the comparison to include at least five more countries and additional variables (location, activity, nature of injury, body region, mechanism, intent, definition of injury, coding system). In addition a systematic report of rationale and validity related to several survey components (recall period, severity threshold, proxy and self report, age of self report, and special populations) will be written. Both of these projects will be published upon completion. It is our plan that with this review of survey questions and components, a standard basic injury module will be developed to assist countries/communities in measuring injury events and allowing for international comparisons.

Table 1. (page 1 of 2) Comparison of injury questions from household surveys

COUNTRY	AGENCY	SURVEY	SAMPLE DESIGN	YEAR	POPULATION	COLLECTION METHOD			REPORTING		RECALL PERIOD (MONTHS)	SEVERITY THRESHOLD	UNIT OF ANALYSIS
						FACE TO FACE	PHONE	MAIL	SELF	PROXY			
AUSTRIA	Statistiks Austria	Microcensus (Translated)	Stratified sample, with weighting for annual national estimates	1997	All ages of noninstitutionalized residents	√			√	√	12	Received medical treatment	Nonfatal, unintentional injuries
FRANCE	CNAM TS – Caisse Nationale de l'assurance Maladie des Travailleurs Salaries	National Health Insurance Agency on Accidents in Daily Living (Translated)	Random sample, retrospective household study	1995	All households with at least one member insured by Social Security System (exclude: non-salary workers or farmers)			√	√	√	12	All accidents, including those needing and those not needing medical treatment	Nonfatal, unintentional injuries (exclude: traffic injuries)
GERMANY	BAUA – Bundesanstalt fur Arbeitsschutz and Arbeitsmedizin	Home and Leisure Accidents, Representative Survey in Germany in 2000 (Translated)	Nationwide representative household inquiries, unclustered sample, with weighting by population structure and socio-demographic factors	2000/ 2001	Resident population		√		√	√	3	Medically treated or affected for at least 14 days	Nonfatal, unintentional home and leisure injuries
CANADA	Statistics Canada	Canadian Community Health Survey	Stratified multistage probability sample	2003	Household residents age 12 and over in all provinces and territories (excluding: Indian Reserves, Canadian Forces Bases and some remote areas)	√	√		√	***	12	Limitation of normal activities	Most serious nonfatal injury-related event (No mention of intent, therefore, both intentional and unintentional are allowed)
UNITED STATES	National Center for Health Statistics, Centers for Disease Control and Prevention	National Health Interview Survey	National probability sample	2004	Civilian noninstitutionalized population residing in the United States with an over sampling of the Black and the Hispanic population.	√			√	√	3	Medical advice or treatment	Nonfatal injury (No mention of intent, therefore, both intentional and unintentional are allowed)
AUSTRALIA	Australian Bureau of Statistics	National Health Survey	Dwellings were selected at random using a multi-stage area sample of private dwellings	2001	Noninstitutional civilian residents	√			√****	√****	1*	Consulting a health professional seeking medical advice, receiving medical treatment, reducing usual activities, treating the injury.	Nonfatal, unintentional and intentional injuries
NEW ZEALAND	Public Health Agency, Ministry of Health	Health Behavior Survey (HBS)	National clustered, stratified sample	2004	Civilian noninstitutaionlized population 13-65 years of age		√		√		12	Serious enough to limit your normal activities	Nonfatal, unintentional and intentional injury events
ISRAEL	Central Bureau of Statistics	Health Survey (translated)	Two-stage stratified sample of households in localities.	1996/1997	Entire population of Israel, residing in the state of Israel as well as Jews residing in Judea, Samaria, the Gaza Area and Israeli residents who had remained abroad for less than one year.	√**	√		√	√	Fatal – 12 months	Medically treated	Nonfatal, unintentional and intentional injuries (no information about intent)
MOZAMBIQUE	National Institute of Statistics (INE)	Mozambique Demographic Health Survey Injury Questionnaire	Missing	Missing	Missing	Missing			√	√	Nonfatal – 1 month	Missing	Fatal and nonfatal, intentional and unintentional injuries
AFGHANISTAN	National Center for Environmental Health, Centers for Disease Control and Prevention, United States	Afghanistan Mortality, Injury and Disability Survey (AMIDS)	Multi-stage cluster sample	2002	Noninstitutional civilian population residing in Afghanistan	√			√	√	18	No severity threshold for nonfatal injuries.	Fatal and nonfatal, intentional and unintentional injuries (including war-related injuries)

* The actual wording in Australia's screen question is 4 weeks. **Israel's survey is mainly conducted by phone (~90%). *** For Canada's survey proxy reporting is allowed only if the selected respondent is unable to complete the interview because of health problems.
**** Australia's survey the adults self report and the adult proxy reports for children.

Occupational ICE on Injury

Nancy Stout

The Occupational ICE on Injury group is continuing to collaborate on international comparisons of fatal occupational injuries, and proposes to launch several new efforts. A comparison of fatal work-related injuries in the US, New Zealand, and Australia has resulted in three journal articles:

> Feyer A-M, Williamson A, Stout N, Driscoll T, Usher H, Langly J. Comparison of work-related fatal injuries in the United States, Australia, and New Zealand: Methods and Overall Findings. *Injury Prevention* 2001; 7:22-28.
>
> Williamson A, Feyer A-M, Stout N, Driscoll T, and Usher H [2001]. Use of narrative analysis for comparisons of the causes of fatal accidents in three countries: New Zealand, Australia and the United States, Injury Prevention 7 (Supple I):i15-20.
>
> Driscoll T, Feyer A-M, Stout N, and Williamson A [2002]. Assessing the classification of work-relatedness of fatal incidents: a comparison between Australia, New Zealand and the United States, Injury Control and Safety Promotion 9(1):32-39.

Continuing this effort, the collaborative group is exploring an international comparison of work-related motor vehicle fatalities. Motor-vehicle related deaths had not previously been available from all three countries. Differences and similarities between the three countries in the characteristics of these incidents and the workers involved will shed new light on this leading cause of death to workers.

An effort to expand international comparisons to include more countries is also being launched. As a first step, the Occupational ICE group is seeking information from other ICE members on the sources, definitions, and characteristics of their national data on occupational fatal injuries. The goal of this inquiry is to determine the comparability of such data from other nations and thus the ability to include a broader array of countries in an analytic comparison of international data that are truly comparable.

The following table describes the case selection criteria for inclusion in the broader multi-national comparison.

Case Selection Criteria

Include these groups:	**Exclude these groups:**
Civilian Labor Force, > 15y	Civilian Labor Force, ≤15y
Civilian Labor Force, < 85y	Civilian Labor Force, ≥ 85y
Homicides	Military personnel
Injuries occurring during breaks	Domestic/home duties
Injuries to unpaid family helpers in for-profit operations	Unpaid students
Injuries to self employed people	Trainees to work (unpaid)
Injuries on public highway which do not involve traffic	Bystanders to work
	Suicides at work
Deaths occurring < 1 yr. after injury	Deaths occurring > 1 yr. after injury
	Injuries to volunteers
	Deaths due to heart attacks or other illnesses/diseases
Traffic injuries occurring on a public road – RECORD SEPARATELY	Injuries occurring while commuting between home and work

The inquiry, including a list of questions regarding data characteristics and these criteria is being conducted through the ICE Listserv.

The following ICE members participated in the Occupational ICE group meetings on 13-14 April:

Nancy Stout – USA
Gordon Smith – USA
John Langly – New Zealand
Anneke Bloemhoff – The Netherlands
Emilio Castejon Vilella – Spain (Eurostat)
Andre L'Hours – WHO Switzerland
Barbara Altman – USA
Lois Fingerhut – USA
Anne-Marie Feyer, Australia – was unable to attend but provided significant input prior and subsequent to the meeting.

In addition to discussing and refining the plan to pursue the broader international comparison, several ideas for new efforts were proposed. John Langly proposed a demonstration project to determine the extent of use of ICD-10 activity codes, specifically the "working" codes, in national mortality data. The activity codes were developed and incorporated into ICD-10 for the purpose of providing data on the activity at the time of death. However, it is hypothesized that these codes are rarely applied to national mortality data. Documenting the level of use of these codes in various countries would allow us to determine their value in identifying cases of fatal occupational injuries. Documentation of low usage may also provide stimulus for efforts to increase their application. An inquiry on ICD-10 activity codes will be conducted through the ICE Listserv.

Gordon Smith proposed an international comparison of occupational drowning incidents. The Occupational ICE is seeking international partners for this effort.

The Occupational ICE also proposed organizing a paper session on occupational injuries at the 7th World Conference on Injury Prevention and Safety Promotion in Vienna in 2004. Proposed presentations were discussed and group members agreed to submit abstracts for an international occupational injury session.

Proposed methodology for building multiple injury profiles (MIP)

Limor Aharonson-Daniel, Valentina Boyko, Malka Avitzour, Arnona Ziv, Kobi Peleg

Background - The need for summarizing multiple diagnoses into injury profiles

Multiple injuries are associated with increased severity and mortality when compared to single injuries and require more complex care and facilities.

There is lack of a tool that would enable the summary and description of multiple injuries and support statistical analysis yet maintain the detail of the injury. Any method for summary that uses one (first or most severe) diagnosis distorts the true injury profile and provides a partial picture only. Methods that take into account the contribution of multiple diagnoses to severity (such as ISS[1]) do not aim to preserve the injury details. A comprehensive description is necessary, that will provide a more accurate description of the pattern of injury in the individual and in the population. The proposed method for multiple injury diagnoses combinations (or profiles) aims to achieve the following objectives:

Aims and objectives

- To create a tool that preserves information on the components of a multiple injury.
- To create a method for describing and summarizing injury patterns in populations.
- To standardize this method to enable the conduct of comparative studies in order to create an international nomenclature with harmonized terms and definitions.
- To provide a better description of the injury casemix and hospital workload.

Conceptual framework

The methodology for building multiple injury profiles (MIP) uses as a basis, units defined by the Barell Matrix[2]. The matrix displays all injury ICD-9-CM[3] codes in a two dimensional array where the nature of injury is presented in 13 columns, based on the sequence of codes detailed in the ICD-9-CM classification and the body region in 36 rows, with standard modifications (through grouping and clustering) into 27, 8 and 5 rows. The reduction of the number of rows results in modified matrices, which are easier to handle, but compromise the level of detail available in the analysis. The matrix enables standardized choices of injury diagnostic groups by injured body region (row), injury nature (column) or a combination of both (cell).

For analyzing multiple injuries using MIP, ICD-9-CM codes are allocated into the appropriate cells, from this point onward, the diagnostic codes are substituted with the corresponding matrix cells (this could be done with body regions or injury natures as well, depends on the focus of the analysis) so that the fundamental injury descriptor becomes a matrix cell (row, column or a combination of row and column). The terminology for 'multiple' is then derived from the definition of the basic units in the analysis. Multiple injuries were defined as injuries that fell into more than one group, where 'the group' can be body region row, injury nature column or matrix cells. For example two fractures to the thigh will be considered as one injury.

Important notes:

- Once diagnoses are allocated to matrix cells, the basic units of reference become matrix cells. A person sustaining a multiple injury where all diagnoses fall into the same cell, is considered to have a single injury. The definition of multiple is therefore affected by the units used.
- The decrease in the number of rows or columns enables practical analysis but naturally, results in loss of detail – the ultimate matrix for a project becomes the one that finds the balance between feasibility of data interpretation with a large number of combinations on one hand and the significance and meaning of the grouped categories on the other.

ICE group Discussion

The presentations and discussions at the ICE meeting in April 2003 in Paris focused on the flowchart of the process. (figure 1). In general, the process was agreed upon and accepted by discussion group members.

A problem that was raised and discussed was the unmanageable number of combinations once detail is sought resulting in a large number of body-region rows used. It was suggested that as a possible means for reducing the number of combinations, injuries that are of an Abbreviated Injury Scale[4] (AIS) severity of 1, would not be included in the profile.

It was agreed that we would go back to our data and examine the distribution of diagnoses with an AIS of 1. We will check whether these include injuries that should not be excluded due to significant contribution to the injury, hospitalization or treatment of the patient. If it is agreed

that these injuries can be excluded from the profile, we will examine the effect of the exclusion of these injuries from the profile on the number of combinations and other injury indicators such as LOS ISS and so on. With these results in hand, future discussions will determine whether or not injuries with AIS=1 should be included. Following the ICE meeting, the flowchart was modified as appears in figure2. A preliminary attempt to use this approach on real trauma registry data was published in Injury Prevention[5] (with due acknowledgements to ICE on injury members…). Following is a practical guideline for the use of the MIP methodology. Researchers are urged to try and use multiple injury profiles in their studies and reports. The experimentation of this approach on various data sets is essential in order to make it a universally applicable method. Additionally, a collaboration was formed with Dr Margy Warner's multiple cause of death (MCOD) group with an aim to apply this concept to the analysis of MCOD.

Practical guideline

Introduction: definition of components

Begin with the Barell matrix. Choose the perspective or detail level that matches your needs: i.e. choose the number of regions or natures which represent the level of detail you desire, create groups which are not too small, yet clinically meaningful. The groups can be selected by clinical interest, frequency, unique characteristics or variance between groups, specific study focus and so on. The definition of groups is of utmost significance as it may affect the results. A non-sensitive selection of groups may result in missing important information, particularly in groups of small frequency.

Frequency examination and selection of groups [injuries, not patients]

A. Allocate injury codes into matrix cells

B. Body Region / Injury nature groups

B1. Produce body-region/ Injury nature group frequency distributions (matrix rows/columns)

B2. Examine, explore, study severity, hospitalization characteristics and outcome of various groups, define clustering/grouping level

B3. Repeat stages B1-B2 until resolution is sufficiently informative.

B4. Select Body Region/ Injury nature groups to serve as the basic units for the modified matrix.

C. Build Modified Matrix using selected rows and columns

Examine frequency, explore data.

Notes:

- Stages A, B and C produce frequency distributions of injuries, not of patients.
- It is important to keep reference to the original matrix row and column labels, in order to avoid confusion between old and new rows/columns

Tip: comparison between populations often helps in focusing on differences and creating relevant groups with specific focal points for each study population.

Injury profile construction and examination [patient level]

D. Body Region (Rows) injury profile

D1. Build vectors containing multiple body region rows (body region profile)

D2. Explore frequency.

D3. Examine severity, survival or other descriptors of each profile

D4. If the number of combinations is large in a way that interferes with the ability to perceive the complete picture, it is necessary to reduce the number of combinations presented. This can be done through combining similar groups (clinically or otherwise) and by clustering infrequent profiles (unless they are unique or of particular interest) into combination or 'other' group.

D5. Repeat stage D2 and start using MIP for data analysis.

D6. Create a variable that counts and sums the number of components in each profile. This variable enables a simple comparison of populations in regard to the proportion of single or multiple injuries in each population before going into the detail of what these are.

E. Injury Nature (Columns) injury profile

E1. Build vectors containing multiple injury nature columns (injury nature profile)

E2. Repeat stages D2-D6 above for columns instead of rows

F. Matrix (cell) injury profile

F1. Build vectors containing multiple matrix cells (matrix cell profile)

F2. Repeat D2-D6 above for cells rather than columns or rows

Important notes:

- Stages D, E and F produce frequency distributions of patients, not of injuries.
- After clustering infrequent profiles into 'other' and building the format to your satisfaction, use it on this population. Review before applying to another population as different population combinations may be (will be) different!

Use MIP

Once defined, profiles can be used in data analysis as another patient characteristic (the patient can be described by his injury profile in the same manner he would be described by his age or sex). The distribution of this data for the population enables perceiving a broad picture of injury characteristics in association with various mechanisms or injury circumstances. The use of injury profiles in describing the injured improves the understanding of case-mix and can also be useful for efficient staffing in multidisciplinary trauma teams and for various comparisons.

Sidetrack approach: Treatment of "others"

The category named 'Other' (both in the one dimension and in the two dimension analyses) was built of many groups of small frequency; therefore, it consists mostly of multiples, a mish mash of conditions. Due to the large proportion of multiple injuries in this group, "other" has a high proportion of severe injuries in it. After taking care of all the large groups, it needs to be taken apart and 'individualists' explored, as they can not be treated using general terms.

We would greatly appreciate any comments on the proposed methods, reports on difficulties in application, suggestions for improvement or any other insights or advice people may have. For any communications, request for support or technical advise, please contact Dr. Limor Aharonson-Daniel at limorad@gertner.health.gov.il.

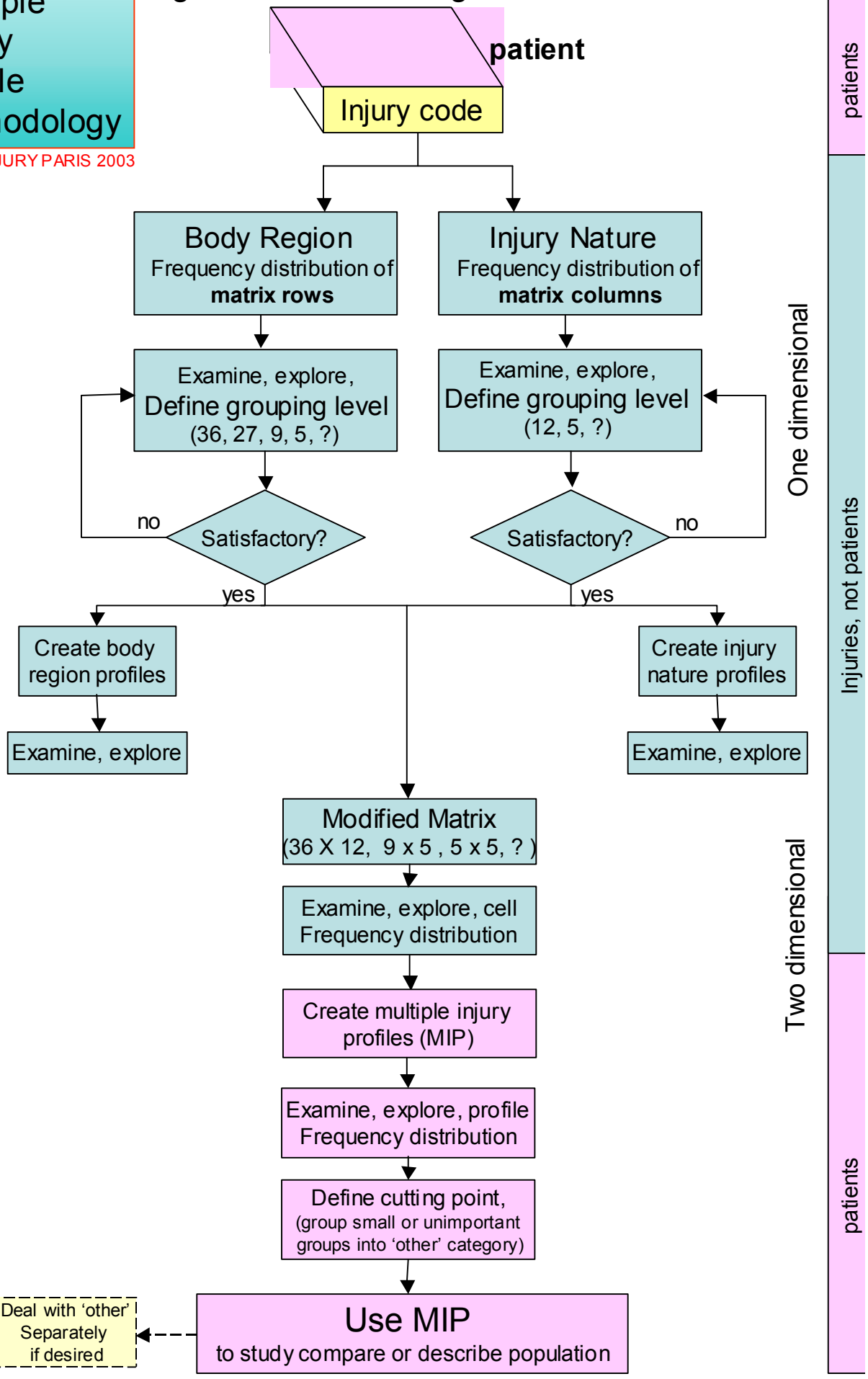
References

1. Baker SP, O'neill B, Haddon W, Long WB. The injury severity score: a method for describing patients with multiple injuries and evaluating emergency care, J Trauma 1974; 14:187-196.
2. Barell V, Aharonson-Daniel L, Fingerhut LA, Mackenzie EJ, Ziv A, Boyko V, Abargel A, Avitzour M, Heruti RJ. An introduction to the Barell body region by nature of injury diagnosis matrix. Inj Prev 2002 8: 91-6.
3. Practice Management Information Corporation (PMIC), International Classification of Diseases, 9th revision, clinical modification 5th edition (ICD-9CM), Los Angeles 1998.
4. Association for the Advancement of Automotive Medicine. Committee on Injury Scaling. The Abbreviated Injury Scale-1990 Revision (AIS-90). Des Plaines IL. 1990
5. Aharonson-Daniel L, Boyko V, Ziv A, Avitzour M, Peleg K. A new approach to the analysis of multiple injuries using data from a national trauma registry Inj Prev 2003:9:156-162.

Multiple Injury Profile Methodology

ICE ON INJURY PARIS 2003

Figure 1: ICE meeting flowchart



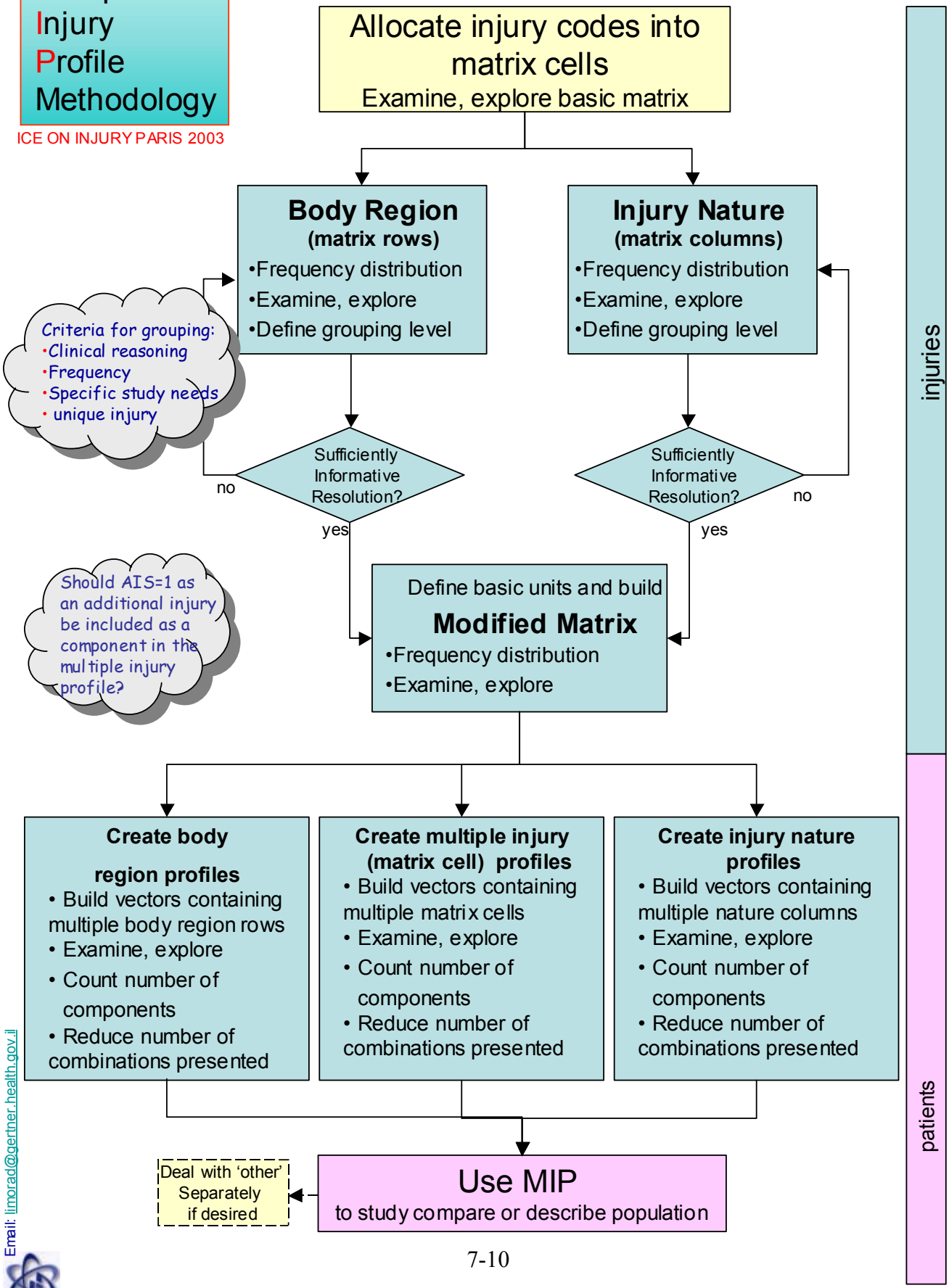
Israel National Center for Trauma and Emergency Medicine Research,
Gertner Institute for Epidemiology and Health Policy Research, Israel

Email: limorad@gertner.health.gov.il

Multiple Injury Profile Methodology

ICE ON INJURY PARIS 2003

Figure 2: Post ICE meeting flowchart



Email: limorad@gertner.health.gov.il

Strategic Planning Work Group - Summary of Efforts to Date

Sue Scavo Gallagher

Background

The ICE on Injury Statistics held its first meeting nine years ago in May 1994. This ICE was initiated to improve the comparability and quality of injury data across countries with a focus on the collection, coding, and grouping of injury data. There are approximately 30 core participants from a dozen countries who meet annually and participate in working groups and research. ICE is sponsored by the National Center for Health Statistics (NCHS) with additional funding from the NIH, National Institute on Child Health and Human Development (NICHD)

ICE has worked well through voluntary participation using an ad hoc arrangement and has been successful in moving a number of injury data methodological issues ahead for the field of injury prevention and control. At the same time, ICE members have benefited from their collaboration with other members. Much of the work of the ICE can be found on its website: http://www.cdc.gov/nchs/advice.htm

PROBLEM

Continued funding is an issue, both for the annual meeting and for actual project work. The ICE on Injury generally sponsors bi-annual meetings in which non-Federal participants are provided travel to the meeting (including airfare, hotel accommodations and per diem) and during years coinciding with the World Injury Conference generally sponsors meeting space. The meetings can be very expensive primarily because of the costs of the international travel. Participation in the meetings and ICE projects is carried out using time and sometimes materials donated by ICE participants.

During this nine-year period of time, a formal evaluation of ICE efforts and accomplishments had not been undertaken, nor a strategic plan developed to guide its work. Despite the current level of funding with U.S. support, ICE needs to broaden its level and sources of funding, perhaps move towards self -sufficiency, and increase accountability to its funders.

METHODS

In September 2002, the Injury ICE team at NCHS sent out a survey to all those persons who had ever participated in an ICE meeting to gather information on their roles in ICE, their ideas on the goals for the ICE, the conduct and composition of future meetings, future directions, future products and dissemination. 25 participants (about 40% response rate) answered a series of open-ended questions.

In November 2002, six members were asked to serve on a working group to begin a strategic planning process for ICE. The members of the work group were Birthe Frimodt-Moller (Denmark), Susan Gallagher (U.S.), Yvette Holder (Trinidad), James Harrison (Australia), and Susan MacKenzie (Canada). Ruth Brenner (US NIH, NICHD) was asked to serve as a liaison to the group. The charge to this working group was to consider where ICE should be headed, aided by the results of the survey. The goal was to draft a five-year strategic plan for the ICE participants to review and discuss at the April 2003 meeting in Paris.

The ICE team from NCHS provided the results of the survey. The working group reviewed and synthesized these results, identifying themes and issues that needed to be addressed in the strategic plan. Seven components were included in the plan: infrastructure, research dissemination and outreach, training, evaluation of ICE and

individual projects, collaborators, and operations with subheadings of funding, participants, meetings and products. For each component, members of the strategic plan working group individually brainstormed issues to resolve and recommendations to fit within each component of the plan. It was also decided to revise the vision, mission, and goal for ICE on Injury Statistics. A draft was then prepared for presentation at the ICE meeting in Paris.

Discussion occurred during three separate sessions at the Paris meeting both to address the content as well as determine how to proceed with the plan's development.

ISSUES

Participants expressed concern that a more formalized and structured ICE might affect the success of ICE and its future achievements. Not everyone was convinced that a strategic plan and more formalized operations were needed since many accomplishments and contributions to the field had occurred despite a lack of structure.

There was much discussion about how expanding ICE participation might affect or impede the small group nature of meetings and work groups. At the same time some ICE participants felt that the ICE should be drawing in new members, training or doing outreach to some of the countries with less sophistication in the uses of data. Several participants pointed out, however, that expansion of ICE membership and/or activities adds to the problem of finding additional funding. Different categories of members were suggested: (1) institutions with responsibility for injury statistics and injury methods; (2) researchers and resource experts in injury data; (3) targets of opportunity when ICE is meeting in a particular country; and (4) representatives from developing countries.

Although other nations could benefit by expansion, ICE needs to be cautious in over committing its resources and compromising its small group work.

A repeated theme was the importance of maintaining a two way process with open lines of communication between a proposed steering committee and all members.

OUTCOME

The draft of the five-year strategic plan was revised to incorporate the comments of all participants. A five year fixed strategic plan was proposed with review occurring in the fourth year. (See following paper.)

Candidates for a transitional steering committee were nominated and a vote taken. Four organizational members (NCHS, ECOSA, WHO, EC) and four at large members (Australia, Canada, Trinidad, U.S.) were chosen. This two year transitional steering committee will be charged with implementation of a strategic planning process and parts of the strategic plan itself. The major efforts will be the development of an annual work plan and the development and implementation of a business plan for self-sufficiency and continued operation.

Beginning in July, the steering committee will begin its discussions and will be chaired by Yvette Holder of Trinidad.

Five-Year Strategic Plan for ICE on Injury Statistics Components

Committee Members: Birthe Frimodt-Moller, Sue Gallagher, James Harrison, Yvette Holder, and Susan Mackenzie

Liaison to Work Group: Ruth Brenner, NICHD

RATIONALE: ICE has worked well through voluntary participation and been successful with an ad hoc arrangement for nearly 10 years. However, to insure sustainability, a more formalized structure is needed to enhance self-sufficiency and allow for the receipt, administration and accountability of outside funding.

This new structure is not intended to interfere with the successful small group ICE process.

A five year fixed strategic plan is proposed with review occurring in the fourth year. Components of the plan follow and were derived from the synthesis of 25 responses received from a 2002 survey sent out by the NCHS Injury ICE team. This draft also reflects the comments of participants in the April 13-14 ICE meeting sessions in Paris, France. It was stressed by all present that the ICE should continue to be a two way group process between the steering committee and all members.

I. Infrastructure

A. Develop an expanded infrastructure to support the work of the ICE

1. Appoint or elect an executive steering committee of 6-8 persons. The SC will be appointed for a two-year term and reviewed in two years. (Completed April 14, 2003 – vote taken at meeting. Four organizational members and four at large members elected. NCHS- Fingerhut, ECOSA -Mulder, WHO- McGee, EC- Frimodt-Moller, Australia- Harrison, Canada - MacKenzie, Trinidad- Holder, U.S. - Gallagher
    a. Provide guidance to the ICE leadership
    b. Coordinate the direction of ICE activities
    c. Propose new directions that are in keeping with ICE goals
    d. Set up quarterly meetings via conference call to facilitate implementation of the strategic plan
    e. Develop an annual work plan
    f. Develop and implement a business plan for self- sufficiency and continued operation. Explore non- profit status. See VI A.
2. Develop a communications plan to improve dissemination of ICE activities and solicit items from ICE members to "beef up" the website. See III Dissemination and outreach.
3. Appoint subcommittees to work on completing components of the strategic plan
    a. Each subcommittee should include an SC participant
    b. Assess whether ICE should be institutionalized as a permanent network
        1. Examine similar efforts, e.g. Cochrane Injuries Group

II Research

A. Develop and implement a research agenda related to the ICE mission

1. Prioritize topics in the agenda and become more focused on a realistic number of projects (see list of potential collaborative projects)
2. Select about five areas that will maximize participation and productivity.
3. Establish working groups to carry out
4. Assign a leader who will oversee the development of a work plan with measurable objectives.
5. Develop a mechanism to fund meetings of working groups
6. Investigate possible grants and foundations across the world
7. Identify feasibility of financing international collaboration for specific projects, e.g. through the European Union Public Health Program for Injury Prevention
8. Compile a list of areas of future research (what we would like to have instead of current best practices)

III. Dissemination & Outreach (marketing)

A. Develop a marketing and training plan that may include:

1. Develop a packet of materials to introduce ICE to potential funders and new members
2. Identify services and expertise that ICE members can offer to other countries and organizations.
3. Identify a key contact in every country in the world who should receive ICE information in a proactive manner.
4. Expand access to and promote the list serve to key country contacts
5. Expand website to include a list of best practices (with alternative pros and cons) and a list of future research
6. Develop a regular column in one Injury Journal
7. Develop a special issue of a journal devoted to ICE work
8. Publish articles in peer reviewed journals and follow-up with policy recommendations, which are widely disseminated
9. Acknowledge ICE and provide web URL on all publications and during presentations.
10. Use the website to post presentations and synopses of work in progress
11. Produce a triennial report on international injury statistics
12. Include a focus on involving developing countries in ICE, e.g. regional contacts
13. Provide systematic training in the application of ICE products, i.e. the Barell Matrix, the surveillance guidelines, the indicators
14. Conduct training workshops with registration fees
15. Piggyback training on to an existing course such as the Hopkins Summer Institute or the Karolinska Institute
16. Develop training courses in data collection, analysis, and reporting of data for developing countries and other markets
17. Develop user friendly guidelines to increase use of ICE products, i.e. mortality matrix, Barell matrix, injury indicators
18. Develop some web-based training tools

19. Develop courses in conjunction with world conferences

IV. Evaluation of ICE with measurable objectives

A. Each project working group should have an identified leader, a work plan, measurable objectives, activities and tasks, and anecdotes relating to the impact of their work. This information should be provided to the larger ICE membership.

B. The steering committee should set measurable objectives for the overall ICE

C. Develop a set of evaluation measures to put ICE achievements into a time perspective, e.g.

i. By April 2004, the steering committee will have flushed out component 1 infrastructure e and f

ii. By 2006, 10 countries will publish their injury mortality data using the ICE Matrix

iii. By 2005, the Barell Matrix will be available with ICD 10 codes

iv. By 2006, international agreement will be reached on core injury indicators for fatal and non fatal injury

v. By 2006, produce and disseminate four ICE products

vi. By 2006, add four developing countries as ICE members

D. Assess how products have been used to influence policy and/or advocate for changes. Include anecdotal evidence.

E. Facilitate availability of international injury data

1. Develop a data base of war and terrorism-associated injury deaths with representation of at least two countries from each continent by 2005
2. Add an objective from the indicators exercise
3. Advocate for constructive critical evaluation of the present "alpha" version of the ICECI and for completing French translation (including new modules?). In the future document the use of the ICECI internationally
4. Promote cross national analysis of injury data
5. By _____develop and submit a manuscript to a peer reviewed journal on the contribution of agriculture to occupational injury mortality internationally

V. Collaborators

A. Expand ICE member countries

1. Determine the desired size of ICE
2. Identify and recruit potential new members (see VI Operations, B. Participants)

B. Identify other agencies whose aims are congruent with ICE and develop strategic alliances, i.e. Karolinska Institute, CDC, PAHO, WHO, NCIPC, MRC (South Africa), Australian Injury Prevention Network, Inter-American Coalition for the Prevention of Violence, to be established European Injury Prevention Network)

VI. Operations

A. Funding

1. Strengthen operations by establishing a link with the WHO office dealing with ICD and the Family of International Classification
2. Identify mechanisms to establish ICE as a discrete and distinct entity that may accept funding from several agencies
3. Develop a plan to fund the continuance of ICE meetings ($80,000 for Paris), actual project work ($0 allocated), and the participation of new members, especially those from developing countries
4. Consider other mechanisms to share the financial burden, e.g., different countries serve as meeting host by providing venue and food, rotate adoption of ICE by various agencies, approach WHO for this international effort, identify institutions to parent ICE projects
5. Consider asking members who are able to do so to pay their own travel expenses.
6. Develop criteria for paying for member travel to meetings

B. Participants

1. Continue to have smaller working subgroups to facilitate involvement of participants and cross country collaboration
2. Specifically define the role of ICE participants for new members
3. Define how one becomes a member of ICE
4. Develop a formal designation process for organizations and individuals to be members of ICE
5. Perhaps designate different classes of participants in ICE: institutions with responsibility in this area, researchers and resource experts in this area, targets of opportunity and beneficial exposure when ICE meeting is in a particular country, and developing country representatives

C. Meetings

1. Continue to use annual meetings as a time for working groups to meet and obtain feedback from the larger forum of participants
2. Hold more than one annual face-to-face meeting for working groups
3. Hold Symposia every three years, inviting a broader group.
4. Hold ICE meetings in conjunction with other international conferences, piggybacking as we have done.

D. Products

1. Identify barriers and facilitators to more widespread use of ICE products
2. Identify new products that others can use to guide collection, presentation, interpretation and comparison of injury data
3. Identify additional products that ICE should produce

VISION
There will be injury statistics, which are internationally comparable and useful for injury prevention and control.

MISSION
The mission of the Injury ICE is to improve international comparability and quality of injury data. The ultimate aim is to provide the data needed to better assess the causes and consequences of injury, differences in injury occurrence over time and place, and the most effective means of prevention and control.

GOAL
To provide a forum for international exchange and collaboration among injury researchers who develop and promote international standards in injury data collection and analysis. A secondary goal is to produce products of the highest quality to facilitate the comparability and improved quality of injury data.

OBJECTIVE LONG TERM – Improve comparability and quality of international injury data

OBJECTIVES SHORT TERM – TBD See list of potential collaborative projects
ACTIVITIES – TBD
TASKS – TBD

POTENTIAL COLLABORATIVE PROJECTS BY THEME

There needs to be an assigned leader for each project, a plan, and an objective
This list should be pared down to about 5 items with a leader, plan, and measurable objective.
We need to define what an ICE project is, further discuss the definition of "injury", and provide anecdotes of the impact of all project work.

Developing injury indicators (research agenda):
injury indicators
occupational injury/agriculture
Disability
Standardization info poisonings
Complications?
Injury severity measurement
long term consequences injury
Casualties of war

Methodology issues (research agenda):
Household surveys
Barell matrix and multiple injury (?)
Methodology standards research analysis
Co-morbidity
Repeated hospitalization
Trend analysis – here or with indicators?
Improving timeliness of injury surveillance systems

Mortality and hospitalization coding issues:
Multiple causes of death/selecting main injury
Definition death (with co-morbidity)
Analysis of multiple cause-of-death data
Update Barell matrix to ICD-10

Advocacy for policy making:
Improving existing data and increasing its programmatic application in all countries
Advocacy for resources and leadership for implementation of #19
External cause and injury coding updates ICD-10
Evaluation of strengths and weaknesses of existing national and international statistical databases for policy-making, public health/health care planning and research.

Incorporating Disability Measures Into Injury Measurement

Barbara M. Altman

Nonfatal injuries have the potential for contributing to long-term consequences that can become costly for the individual, their families and their communities. While many injuries are superficial, requiring a few stitches, bed rest or other relatively simple ameliorative services, other forms of accidental injury from automobile crashes, intentional injuries that result from weapon use and injuries resulting from terrorist activities can have much more serious repercussions for the individual and society. In these circumstances, victims are frequently left with residual impairments that are associated with functional limitations that can translate into restrictions on limitations in life activities that were not experienced prior to the injury. These limitations or restrictions in tasks or other social role activities are conceptualized as disability. Understanding the disability outcomes of injury would provide a more comprehensive picture of injury and its sequelae and give a clearer picture of the economic and social costs.

Disability measurement in relation to injury measurement has been raised frequently as reflected in the minutes of the 2001 ICE meeting, issues raised at the European Injury Prevention Meeting and extensively in the literature. The purpose of this presentation is to examine the conceptualization of disability in order to understand the possibilities as well as the problems associated with measurement for these purposes. In addition I will review briefly some international work on measurement of disability already in progress in the Washington City Group. This work may be a useful jumping off place for ICE's consideration.

There are two models of disability commonly in use today. The Institute of Medicine (IOM) model is based on work originally done by Saad Nagi (see figure 1 in appendix). This model was developed as part of the evaluation of rehabilitation science and engineering in the 90's. This is the second of two models IOM developed. The first examined factors associated with the risk of becoming disabled while the second examined the best way to translate scientific findings into clinical and social benefits. The emphasis of this model highlighted the interaction of the persons with a physical or mental limitation with their physical and social environment, thus identifying disability as the behavior that results from this interaction. Measurement of the components of the model is left to the user.

The second and more elaborate model is that provided in association with the International Classification of Functioning (ICF). The origin of this model was associated with the development of a classification system for disability similar to that used for classification of disease – ICD (see figure 2 in appendix). Initially developed by Phillip Woods in the late 70's, the World Health Organization sponsored an update that took about 8 eight years and has now received international approval. The model is accompanied by a classification system that provides domains and categories with which to identify different components of disability, however the measurement tool and

standards for guidance as to how to classify individual domains/categories are not yet developed.

The models are similar in several areas. Both include elements that identify a state of impairment or an indication of limitation in function of parts of body structure. Both also include reference to participation or the lack of participation in what could be called social roles. Both also include the importance of environment as a contributing element. IOM identifies two components of environment, physical and social as encompassing context, while ICF identifies environment as a whole, both physical or material and societal as interveners at all the conceptual domains. ICF also includes personal factors as interveners at all the conceptual domains while those personal factors are presented as precursors in the IOM model.

The models have differences as well, including the use of the term "disability". In the ICF, "disability" is interpreted as the negative aspect of all the domains. In the IOM model, disability is not given a positive or negative valence, but is interpreted as the outcome of the interaction of person and environment. In addition, the ICF offers a classification scheme, albeit without a specified accepted norm or standard of functioning or an operationalized measurement tool that can connect the concept with the chosen classification categories.

Using information from the models, we see that disability can be identified either at the individual level based on several aspects of functioning alone or at the participation level which implies the person/environment interaction. At the individual level there are a variety of conceptual approaches including impairments, functional limitations, activities or purposive actions, participation or involvement in social life that can be measured. Addition of an environmental perspective, the individual's physical or social contexts would give a more complete picture of the situation, but would likely make the data collection process lengthier and more complicated.

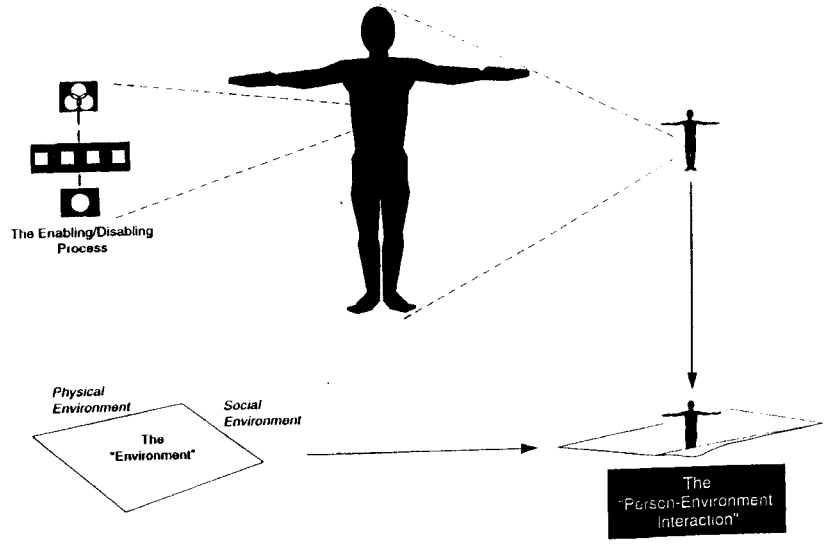
There are any number of indicators available that can provide this information at the individual level from as broad an operationalization as the presence of physical trauma or disease, which assumes the level of risk for disability is worth considering to indicators of difficulties with sensory functions or physical movements like mobility. So, for example, identification of spinal cord injury would carry the assumption of disabling consequences greater than that of a broken toe. At the same time an indication of inability to see a person across a room is a more specific indication of some functional limitation. As the specificity of measures becomes more focused, the identification of disability associated with injury would become narrower. Measures cannot be used haphazardly, however, but must be considered carefully in order to address the purposes of the data collection and the reasons that information on disability is being included. Also the nature of the definition of disability that is needed to capture the population of interest is an important consideration. The tensions between detail of data and respondent burden or ability to answer are yet another factor to be considered when developing a disability measure to accompany injury identification.

To translate from the conceptual models to measurement of disability associated with injury needs careful consideration. The Washington City Group Measurement Matrix indicates that data collectors must consider three components of measurement before appropriate questions can be selected (see table 1 for more details on Matrix). Those three components include purpose of measurement (what is the nature of the research question), domain or concept to be measured (what aspect/s of disability will address the research question) and characteristics of questions and answer categories that provide the information. Questions researchers must ask are: what kind of information on disability is needed to understand the outcomes; which element of conceptualization of disability is most important for the kind of information that is being sought; and what format of question will provide the necessary information and level of detail?

Possible purposes of measuring disability associated with injury include provision of services for rehabilitation, long term effects for individuals and their families, incidence or prevalence estimates, trend analysis, development of prevention policies and others. Understanding the purposes of measurement also helps us understand if we need longitudinal type data collection in order to ascertain outcomes over a period of time, or if a point in time indicator will suffice. “Disability” or some element of that phenomenon is probably useful information for understanding both prevention and outcomes of intentional and unintentional injury. However, they present very different data collection problems. There is NOT a one-size fit all measure of “disability” to accomplish all needs, but that does not mean it is not a worthwhile endeavor to begin building a measurement repertoire for use in injury research.

APPENDIX

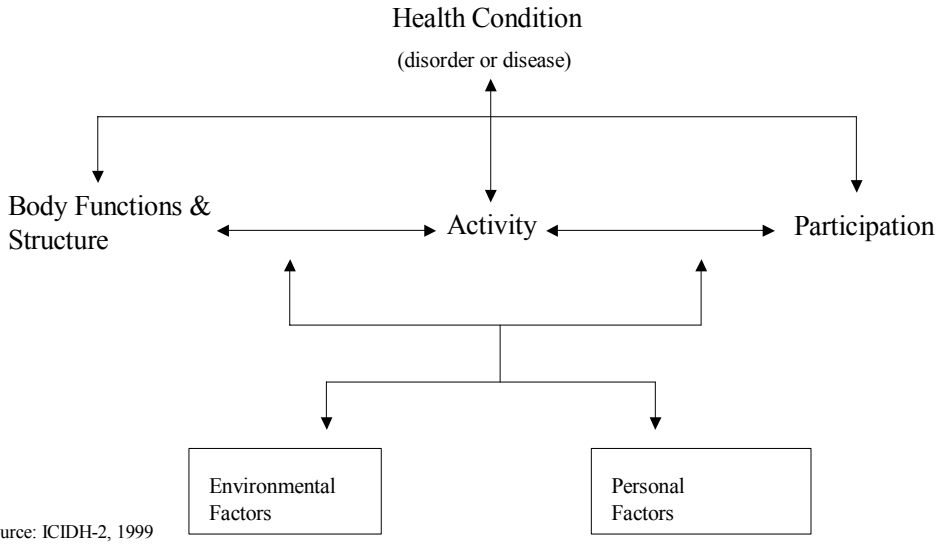
Current IOM Model



Source: Brandt & Pope, 1997

Figure 1

WHO Model - ICF



Source: ICIDH-2, 1999

Figure 2

Washington City Group Disability Measurement Matrix
Abbreviated Draft

Part A	**Part B**				**Part C**		
Purpose of Measurement	**Model Components**				**Question Characteristics**		
	Impairment	**Functional Limitation**	**Activity**	**Participation**	**Duration**	**# Answer Categories**	**Severity**
Part I: Individual Data	Focus of data collection is on the individuals who will be served by the program or product or a program itself						
A. Equalization of Opportunity							
B. Rehabilitation							
C. Needs Assessment							
D. Prevention							
E. Research							
Part II: Population/Aggregate Data	Focus of data collection is policy planning and program development for the total population that will be served by policy development or implementation						
A. Equalization of Opportunity							
B. Needs Assessment							

Part A	Part B				Part C		
Purpose of Measurement	**Model Components**				**Question Characteristics**		
	Impairment	**Functional Limitation**	**Activity**	**Participation**	**Duration**	**# Answer Categories**	**Severity**
C. Prevention							
D. Research/ Trend Analysis							
E. Public Information							

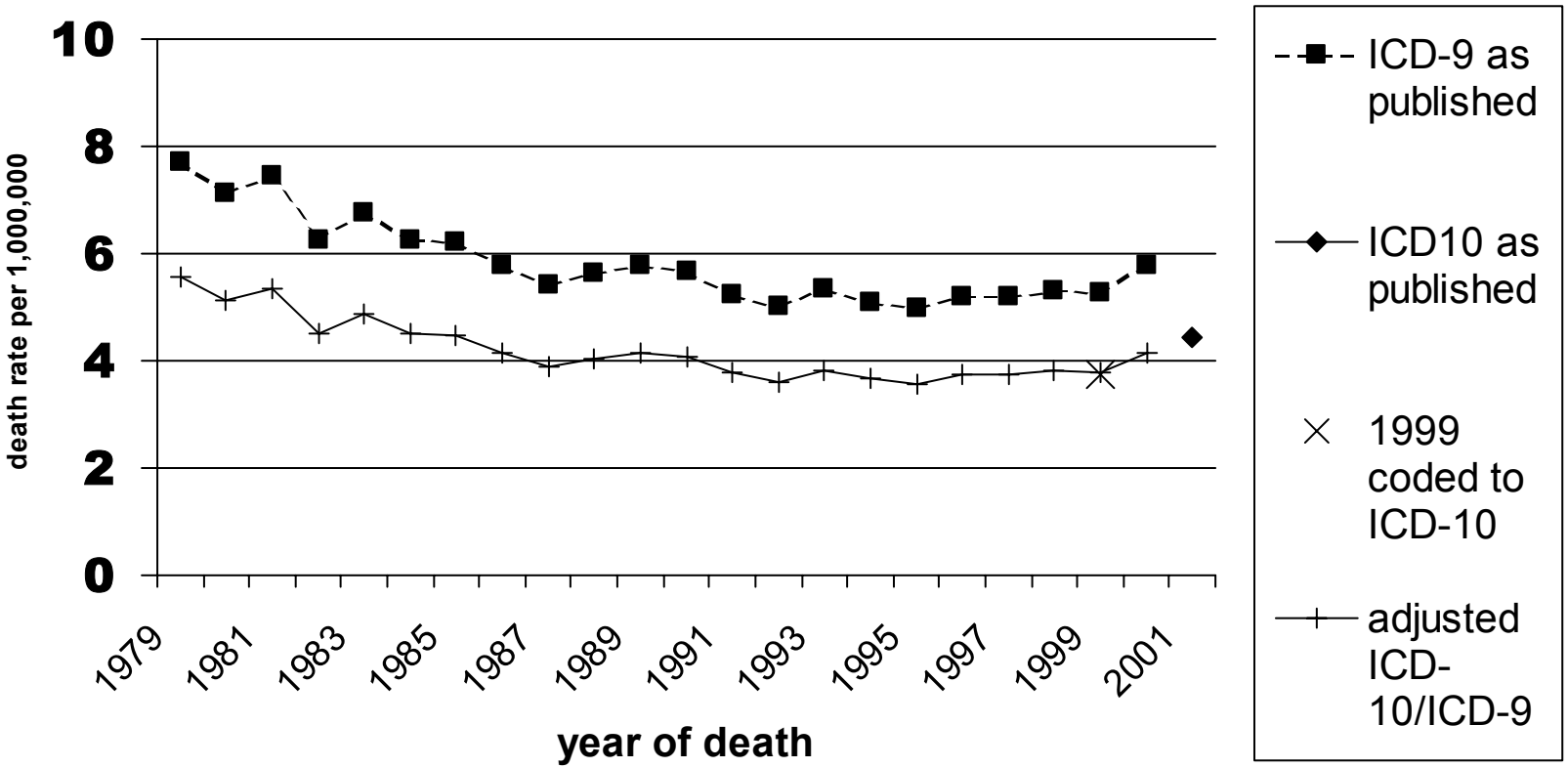
Results of the ICD-10 bridge coding study in England and Wales

Cleo Rooney, Clare Griffiths and Lois Cook
Health and Care Division, ONS

Bridge-coding methods

- independent coding to ICD-9 and ICD-10
- original text and amendments
- routine coding procedures/ rules
  - US Software, clerical for inquests
- all deaths registered in 1999
- comparability ratios
  - eg IHD deaths in ICD-10/ IHD deaths in ICD-9
  - age and sex specific, standardised

ASMR from falls - males, England and Wales 1979-2001 as published and adjusted



Fracture cause unspecified in ICD-9 > unspecified accident in ICD-10 accounts for most of the change

	ICD-10			
ICD-9	**Falls W00-W19**	**osteoprosis /pathologic al fracture M80-M81**	**unspecified accident X59**	**Total**
Falls E880-E888 inclusive	**2175**	**22**	**1616**	**4056**
Falls (E880-E886, E888	2173	7	10	2237
Fracture, cause unspecified E887	2	15	1606	1819

Comparability ratios for deaths coded to accidental falls in ICD-10 (W00-W19) E&W 1999: number of deaths in ICD-10/ICD-9

	ICD9 code	Ratio	confidence limits
male	E880-E888	0.72	0.69 -0.74
female	E880-E888	0.46	0.44 -0.48
male	E880-E886, E888	1.02	1.00 -1.03
female	E880-E886, E888	1.00	0.98 -1.01

Comparability ratios for accidental falls in selected countries

- Scotland 1.00
- Sweden 0.35
- USA 0.85

- Scotland - large gains from pneumonia cancelled out losses from E887 and to osteoporosis
- Sweden - very large proportion were E887, and lost to Osteoporosis

Other comparability ratios in England and Wales

- Suicide / Self harm 1.00
- Undetermined intent c 1.0
- MVTA - ??
  - Land Transport Accidents

Other issues

- Too much detail demanded
  - falls > MRG to split X59
  - ‘car crashes’ in Mexico > 40% fall in MVTA deaths
- suicides in some countries
- poisoning
  - better information from injury codes, but less detail in external
  - ?need to identify specific combinations - MRG

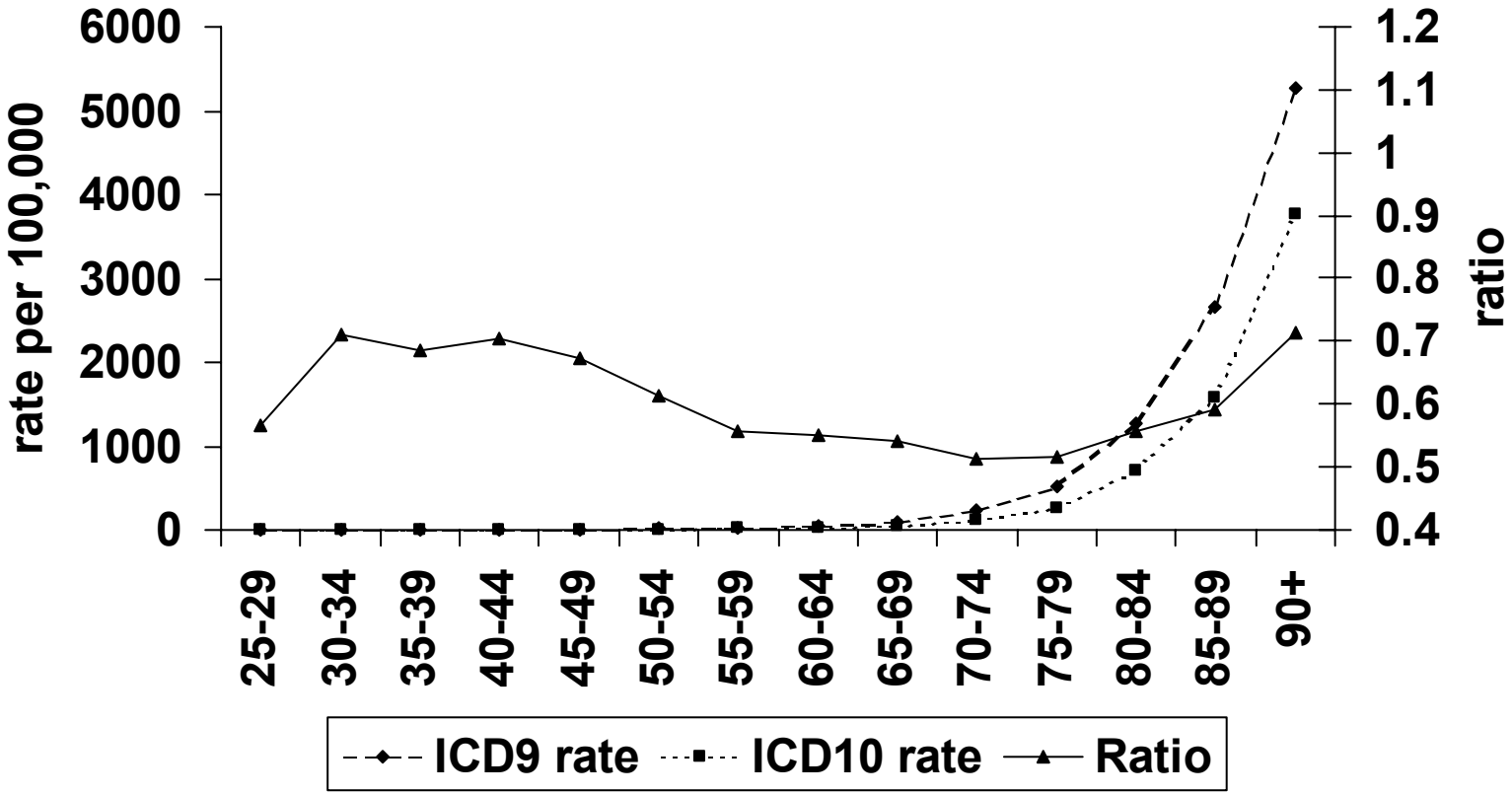
ONS Continuing Comparability Work

- Cancers by site, land transport accidents
- Main injury
- Bridge code sample of 1996
- Data are available via National Statistics Website
  - ICD-9 and ICD-10 codes, age, sex, region
- Bridge-code updates to ICD-10?
  - Which version of Rule 3?
  - Every 5 years?

Further information on bridge-coding study and full results

- ICD-10 Webpages on National Statistics website
  - www.statistics.gov.uk > health and care
- Queries on ICD-10 & deaths data > e-mail
  - ICD10.mortality@ons.gov.uk
- Queries on other ICD issues > e-mail
  - who@ons.gov.uk
- More details in Health Statistics Quarterly 8, 13 and 14
  - www.statistics.gov.uk/downloads/theme_health/HSQ8Book.pdf
  - http://www.statistics.gov.uk/downloads/theme_health/HSQ13_v4.pdf

Pneumonia mortality rates in men, E&W, 1999: by age, ICD-9, ICD-10 and comparability ratio



EU Public Health Programme: 2003 to 2008

Mathilde Sector

Public health action programme: A key instrument underpinning the development of the Community's health strategy and to involve applicant countries in the implementation.
Prior to this programme, injury was one stream alongside health promotion, information and education, cancer, AIDS, drug dependence, rare diseases, health monitoring, and pollution-related diseases. With the new Health Programme 2003, all of these vertical programmes should be integrated in a horizontal action programme.

Priority areas in 2003:
- Strand I:Health Information
- Strand II: Health Threats
- Strand III: Health Determinants

The objectives of this new programme are to focus on the following issues: improve the health information and knowledge in Europe; develop and operate a health monitoring system (incl. Health Indicators); disseminate, transfer, share information at the EU level (surveillance and response system); improve E-Health-online; identify methods for reacting health emergencies; and analyse and report on health issues relevant at the EU level and provide recommendations based on health technology analysis, health impact analysis, and best practice.

Injury has been identified as a key policy area, and therefore money has been provided for a Working Party on Injuries, including self-inflicted injuries and violence. Injury proposals will be sent in for Strand I and Strand II but not for Strand III.

Calendar for project proposals in 2003:
- March: Call for proposals
- May: Deadline for proposals
- September: List of accepted proposals

The projects will be 80% funded for a duration of 24 months, with involvement of candidate countries especially important. The total funding amount for projects is still unknown, varying from 1 million to 6 million EUR.

Reminder:
7th World Conference on Injury Prevention and Safety Promotion
June 6 – 9, 2004 in Vienna, Austria, Europe

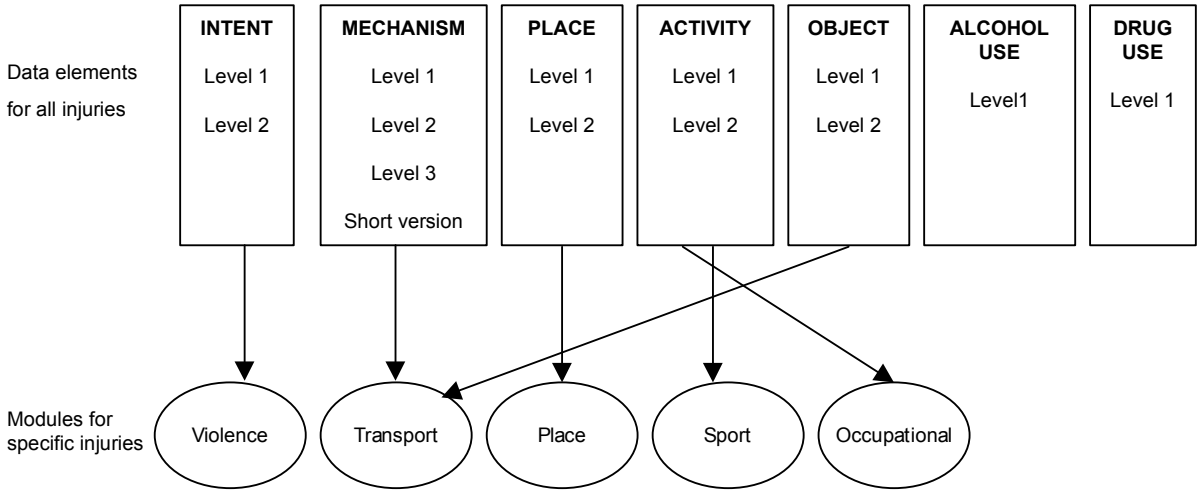
International Classification of External Causes of Injuries (ICECI): an update

Saakje Mulder

ICECI: the classification

Design of ICECI. ICECI is
- multi-axial,
- hierarchical,
- modular,
- a pick and choose classification, and a
- reference classification.

Structure of ICECI



The relation between ICECI and ICD-10:
- Complementary: ICECI is not replacing parts of ICD
- Comparable (to extent possible) by means of the ICE injury matrix

The current state of affairs

WHO stated in April 2001:
ICECI is a WHO related classification in development and is subject to formal WHO procedures (which have not yet been decided upon) for acceptance as related classification within FIC (Family of International Classifications).

In October 2002 it was decided that ICECI has reached the alpha-version within the FIC, although it is not yet clear how alpha-status is being defined.

A taxonomic review of ICECI has been carried out by the Australian Institute of Health and Welfare, National Injury Surveillance Unit, Flinders University, and the National Centre for Classification in Health, University of Sydney. A project proposal was written in May 2002: the project was finished in October 2002. The Core data set of ICECI and its Transport module were reviewed. No revision of contents or scope was intended.

The objectives of the taxonomic review were:
- to provide a basis for indexing
- to be (part of) recognition at WHO-FIC-meeting in October 2002

The activities within the taxonomic review were:
- a review according to taxonomic principles,
- to find areas for improvement,
- to come up with proposals for solving problems
- to implement the improvements

The inclusion of the results from the taxonomic review plus comments from users has been included in the latest ICECI version 1.1a.
The French translation of ICECI was reviewed by Bertrand Thelot (France) and colleagues from several countries where French is spoken.
It is foreseen that during the summer of 2003 James Harrison will come up with a new and sophisticated method to index a classification, in particular ICECI.

The use of ICECI

Several derivatives of ICECI were developed:
- CDC's short version (United States)
- Less resourced countries (WHO)
- ISS Coding manual in Europe (European Union) (Emergency Department based)
- Burn injuries (in development by the International Society of Burn Injuries and the European Burn Association: check the current version, decide upon a module and/or a minimum data set)
- Spinal cord injuries (ICECI is a preferred candidate for an international effort)
- Minimum Data Sets in Europe (European Union)

The Minimum Data Sets on Injuries (MDS-Is) in Europe have been developed in the past two years, resulting in five MDS-IS, which are
- subject to aim and target group (see Scheme)
- compatible with most relevant international classifications (of which ICECI is the most important)

The MDS-Is are meant to be used for:
- Reporting format
- Improving existing surveillance systems
- New injury surveillance systems

Objectives	**Settings**			
	Fatalities	Other health care	Hospital admission	Emergency Department attendances
1 Monitor the total number of injured persons in the specified setting	MDS-Is-1			
2 Monitor the total number of injured persons by intention	MDS-Is-2			
3 Monitor the total number of injured persons by major accident type, major type of violence and major type of intentional self-harm	MDS-Is-3			
4 Monitor the total number of injured persons by specific categories	MDS-Is-4		MSD-Is-5	

Some examples of how ICECI is being used (despite the fact that ICECI was not yet actively being promoted and after a passive search for use):

- Sports module National Health Interview Survey data (United States)
- Violence data (a pilot in 3 EU-countries, co-ordinated by Denmark)
- Renewal of the Electronic Medical Record (Indonesia)
- Changing the datasets in 3 Emergency Departments in Oxfordshire (United Kingdom)
- Research project (Perth, Australia)
- Personal accidents to be collected in 2003 (Insurance company, Italy)
- Injuries and alcohol and drug abuse (university in Germany)
- International course on surveillance (Sweden)
- Included in a pilot at 10 Emergency Departments in British Columbia (Canada)
- Record information from Coroners (Canada, in development + Australia)
- Study of injuries in the military (Canada)

ECOSA Working Group on quantifying post-injury levels of functioning and disability

Saakje Mulder

Disabilities (i.e. reduced levels of functioning resulting from diseases or injuries) are increasingly recognised as an important component of a population's health. However, within the injury field, empirical, comparable and representative epidemiological data on the incidence, severity and duration of disabilities are scarce and incomplete. Most functional outcome studies in this area have so far focused on adult patients with major trauma. Some studies have been conducted on the functional outcome of the more severe childhood injuries.
For the majority of injury patients, however, hardly any empirical disability data are available. In addition, the available knowledge is difficult to interpret. It seems as if in European countries hardly any knowledge on this important issue is available at the moment. More theoretical and empirical work on injury-related disability has to be done in order to fill the data gaps described above. This work is a prerequisite for the meaningful execution of burden of injury studies and studies into the cost-effectiveness of injury control measures.

For this purpose, European Consumer Safety Association (ECOSA) has established a European Working Group on Post-injury Levels of Functioning and Disability. The group has started with participants from the Netherlands, the UK and Denmark. Within the next few years the group should extend into a network of researchers and clinicians involved in quantifying post-injury levels of functioning and disability from as many European countries as possible.

The aim of the working group to develop a 'common' conceptual framework within the injury research community for calculations on the 'disability' component of the burden of injury at the population level and for evaluations of the (cost-)effectiveness of injury prevention and trauma care, using composite health outcome measures with a disability component (e.g. QALYs and DALYs).
The objectives of the Working Group are:
- to summarise the theoretical background of quantifying post-injury levels of functioning and disability;
- to develop guidelines for future empirical work in this area ('what should be measured for what purposes, how should this be measured, and when should this be measured?');
- to evaluate the available literature (i.e. empirical studies) on post-injury levels of functioning and disability in European countries ('which empirical information is already available within Europe and how can this be applied?'); and
- to formulate recommendations for future theoretical and empirical work ('how should the European injury research community proceed with this subject?').

The Working Group has published a draft report on Quantifying post-injury levels of functioning and disability: why and how? This report includes an overview of the theoretical background of the issue, including an example of empirical data, and the demarcation of the subject.

The Working Group will develop practical guidelines for empirical follow-up studies into post-injury levels of functioning for selected types of injury. These guidelines will contain advice on measurement instruments and moments, methods of data acquisition, additional background

variables to be collected and their (internationally) accepted methods, the numbers of patients to be included, and types of analyses to be performed and possible methods to use.
Secondly, the Working Group will take the initiative for a 'European disability follow-up study' testing the guidelines for selected types of injury: open wounds, poisoning, ankle/foot sprain, wrist fracture, hip fracture, brain injury, spinal cord injury, and multitrauma. The financing for this work will hopefully be acquired through both European and country-specific applications.

The Working Group would like to have input from experts:
- Are you interested in participating in the ECOSA Working Group?
- Are you involved in research related to the topic of post injury levels of functional outcome and disability, or are you aware of any studies that are not yet included in the draft report?
- Are you aware of other European researchers working in the field?
- Do you have any comments or suggestions on the draft report or the work of the Working Group?

If your answer to one of those questions is 'yes', please get in touch with the Working Group.

The current members of the Working Group are:
Ed van Beeck, Erasmus Medical Centre, Rotterdam, the Netherlands
Claus Falck Larsen, University Hospital, Copenhagen, Denmark
Ronan Lyons, University of Wales, United Kingdom
Willem Jan Meerding, Erasmus Medical Centre Rotterdam, the Netherlands
Saakje Mulder. Consumer Safety Institute, Amsterdam, the Netherlands (chair)

For more information: website: **www.ecosa.org** or Saakje Mulder (s.mulder@consafe.nl)

Developing a set of indicators for injuries/accidents for the European Union: a practical approach

Saakje Mulder

Within the European Commission (Directorate General Sanco, Public Health) several projects include the development of 'indicators'. Examples are health indicators in general, road accident indicators, indicators on children's accidents.

At the moment a strategy is to be defined for developing indicators on injuries/accidents. Representatives of the IPP (Injury Prevention Programme) Network (Birthe Frimodt-Moller, Ronan Lyons, Saakje Mulder) have prepared a practical approach/strategy on behalf of the Network on developing a set of indicators for injuries/accidents for the European Union.
The IPP Network has thus far been engaged in work on improving the injury data collection system and its use, i.e. the Injury Surveillance System (ISS) at EU level. This along with other data sources is one of the prerequisites for the future work on injury indicators, which is a priority area for the continued activities under the new Public Health Programme. Some results of the Network's activities during the IPP are reflected in the following.

Definition indicator
An indicator for injuries/accidents is: A unit of quantitative information which reflects, directly or indirectly, the performance of health and welfare interventions (including injury prevention), or of health care facilities on the problem of injuries. (based on definition from the Australian Institute of Health and Welfare Family Services, 1997).

Aim of a set of indicators
We want (1) to provide an overview of the state of affairs concerning accidents/injuries in a certain country or region, and (2) to use this information for comparing countries (e.g. Why does country A perform better on prevention of drownings than country B?).
This means that we need indicators for accident data, but also indicators for possible explanations for differences between countries or regions (like differences in exposure, country profiles, incl. health care systems, etc.).

Scope
We include intentional and unintentional injuries.

Potential use/objectives
The set of indicators might be used for:
- Measuring the magnitude of injuries/accidents, their determinants and the trends therein throughout the EU, leading to priority setting for prevention policies;

- Benchmarking throughout Europe (what is best practice), leading to indication of (inter)national or regional priorities for target groups and interventions;
- Providing a guiding structure for the production of (inter)national public health reports;
- Providing a logical framework for electronic data exchange system;
- Identifying gaps in information leading to indication of priorities for data collection and harmonisation.

Types of indicators

The field of accidents/injuries is very broad and complex. Therefore several types of indicators need to be selected in order to give a clear picture of the problem, its potential causes and explanations for differences noted between countries.
We have initially selected six categories:

- *Country profile*
  These should indicate the overall state of affairs of a country, e.g. the money that is spent on health influences, the magnitude/severity of injuries, the number of inhabitants influences the size of potential risk groups (especially age groups are particular injury risk groups, like children and the elderly).
- *Health system*
  These should indicate the way the health system works in a country. E.g. if everybody first has to visit a General Practitioner before being referred an Emergency Department (ED), this influences the population attending the ED.
- *Cause specific mortality and morbidity (accidents/injuries)*
  These should indicate the state of affairs concerning safety in a country. E.g. the percentage of fatalities due to accidents out of all fatalities.
- *Exposure*
  These should indicate the 'population' at risk concerning injuries in a country. E.g. differences in the popularity of sports will influence the injury pattern.
- *Determinants*
  These should indicate the factors that might influence the occurrence of accidents/injuries. E.g. socio-economic status, ethnicity, cultural behaviour.
- *Interventions*
  These should indicate the effort that has already been made on injury prevention and control. E.g. national injury prevention plans, the number of laws relevant to safety (of course enforcement also plays an important role).

User windows

Because the set of indicators will be used by different users and for different purposes, subsets will be defined. These subsets are named 'user-windows' (see project European Committee on Health Indicators, ECHI phase 1). As an example, user windows might be based on the Minimum Data Set on Injuries (MDS-Is), which were developed as a project of the Injury Prevention Programme. The level of information is based on two dimensions. Firstly, the four levels of priority setting defined for the MDS-Is: (1) monitor the total number of injured persons, (2) monitor the total number of injured persons by

intention, (3) monitor the total number of injured persons by major accident type, major type of violence and major type of intentional self harm, and (4) monitor the total number of injured persons by specific categories. The second dimension is health care setting: (1) fatalities, (2) hospital admission, (3) Emergency Department attendances and (4) other health care attendances.

This means that such user windows for accidents would be based on two dimensions:
- level of priority setting
- health care setting

The level of priority setting leads to hierarchical indicators (a tree structure).
- Level 1: Accident/injuries
- Level 2: Unintentional versus Intentional injuries
- Level 3a: Home and leisure, Occupational, Sports, Road/traffic
- Level 3b: Intentional self-harm, Assault, Other violence
- Level 4a: Falls, drownings, poisonings etcetera.
- Level 4b: Sexual assault, gang-related incident

These levels can be distinguished per health care setting. Health care setting is not always regarded as a separate dimension. However, these settings are for accidents/injuries very important, especially since monitoring is based on these settings.

Ultimate results

As far as possible, indicators already developed will be considered, esp. if they were evaluated and harmonised at the European level. For each type of indicator we will select the most relevant ones (from a long list to a short list). The final selection of indicators will be based on features of the data such as relevance, validity, reliability, timeliness, availability, stability, continuity, sensitivity (to changes over time or by place), comparability (between countries and regions), power of discernment per country.
The ultimate set of indicators for accidents/injuries will include information per indicator on:
- the (original) source;
- the update frequency (information on each indicator needs to be, or at least become, routinely available);
- availability: annual data should be available;
- the exact definition;
- whether the information is listed in ECHI phase 1;
- guidelines for determining the user windows.

Current approach

We will draft a long list of potential indicators. Since the field of accidents/injuries stretches from fall to poisonings, it is not possible to define indicators which will cover the whole spectrum. Therefore it was decided to have a different approach for each type of indicator (see results).

The way ahead

It is shown that determining indicators for injuries/accidents is complicated, because of the broadness and multidisciplinary nature of the field. Future work on the development of injury indicators is part of the current preparation for the Call for proposals related to the Work Plan 2003 for the EU Public Health Programme. The plans include further studies of work achieved during the last few years in various programmes at the EU level, e.g. the ECHI project, projects under the Health Monitoring Programme, such as the CHILD project (Child Health Indicators of Life and Development), and work of core groups under the EUROSTAT Partnership Health, etc. The injury network seeks to build on the results, which are relevant to the injury sphere and also demonstrating evidence of data harmonisation for sources of information at the European level. Development of injury indicators is envisaged as an integrated part of the future Working Parties planned under Strand 1 of the Public Health Programme (cf. Work Plan 2003).

It is suggested to first determine the indicators that give an indication of the overall state of affairs concerning safety in a country. This implies that for some of the more complicated indicators a selection should be made of measures that give an indication (e.g. select five important laws and check how many are introduced in a country). The second step could be to provide guidelines for drafting a set of indicators for specific issues, like a specific set of indicators for drownings. Some of the indicators will be similar to the overall set of indicators (like the ones for country profile), but some will be completely different (like for exposure data).

In the next months, the final design will be decided upon.

Update on injury registration in the Nordic countries

Johan Lund

Background

The Nordic countries have a population of about 25 million, divided in the countries of (population in million in parenthesis): Denmark (5.2), Finland (5.0), Iceland (0.3), Norway (4.5), and Sweden (9.0). During the years a broad collaboration between the countries has been undertaken on many issues including injury registration and classification. Inspired by the developments in the 1970s of the National Electronic Injury Surveillance System (NEISS) in the USA and the Home Accident Surveillance System (HASS) in the UK, the Nordic countries ran pilot projects on injury surveillance systems for home and leisure accidents mainly for product safety authorities (Nordic Council of Ministers, 1978). These projects triggered a need for classification on all injuries that are treated in the health care system. The Nordic Classification on External Causes of Injuries (NCECI) is one of the results of this work, financed by the Nordic Council of Ministers (NOMESCO, 1984, 1990, 1997). The development of NCECI has contributed to the design and development of the International Classification of External Causes of Injuries (ICECI), which was launched last year (WHO, 2002).

Another example of the Nordic collaboration was a seminar held in June 2001 in Oslo on "Injury registration for monitoring and prevention – Experiences and challenges". The seminar consisted of four sessions:

1) Why injury registration?
2) Health based registration for monitoring and prevention
3) Health based registration for prevention – in depth studies.
4) How to build an efficient health-based injury registration system in large urban communities for monitoring and prevention?

The aim of this presentation is to give an overview of the situation of injury classification and registration in the health care system in the Nordic countries. The presentation is mainly based on the report from the seminar (Lund et al., 2002) but also on other available information. Iceland is not covered in this overview as the country has more or less 100% coverage of injury registration by use of the ICD-10 and NCECI classifications.

Injury classifications in the daily routine in the health care system

There are two types of injury registration in the medical health care system: 1) normal registration in the daily routine by receptionists and physicians without extra registration resources, 2) specially designed injury registration system with more comprehensive classifications normally requiring extra registration resources.

In the daily routines in the medical health care system for fatalities and in-patients in the Nordic countries, the 10th version of International Statistical Classification of Diseases and Related Health Problems is used (ICD-10 – WHO, 1992). Chapter 20: External cause of

injuries is in Finland and in Norway modified into abbreviated versions (see Appendix – section B2 for an overview of the Norwegian version). In Finland four digit levels are used for transport accidents (V01-V99) and for violence (X85-Y09), other external causes are coded using the first three digits. An additional variable (with 8 values) is used to classify type of accident: traffic, home, sport, other leisure activity, hospital, occupational, school or kindergarten, other type of accident. In Denmark, a short version of NCECI is used for all injured in-patients instead of ICD-10, Chapter 20.

Minimum Data Sets (MDSs) have emerged in Norway at some general practitioners (Grimsmo and Johnsen, 1999; Lund, 2002) based on ICPC (International Classification for Primary Care – Lamberts and Wood, 1987), and in a two-step surveillance system tested in Oslo (Lund et al., 2003). In the Appendix, some data elements and codes in the MDS tested in Oslo are given.

Completeness of coding of ICD-10 and NCECI in the daily routines

The coding system of the complete chapter 20 in ICD-10 is rather comprehensive and detailed. The three first digits characterise the accident mechanism and intent of the injury. The fourth digit characterises place of occurrence except for the transport accidents (V00-V99), where it characterises traffic roles of the injured person. The fifth digit characterises the activity of the injured person when injured. This complete chapter 20 generally requires extra registration resources in hospitals and EDs in order to get sufficiently complete coding, e.g. less than 5% unknown. Also for fatalities the information available to the physician filling in the death certificate is now and then insufficient for adequate recording. The tables below give an overview of the completeness in average in the Nordic countries for fatalities, in-patients and EDs.

Table 1. Completeness of codes relevant for injuries and accidents for fatalities in the Nordic countries.

Country	ICD-10, chapter 19	ICD-10, chapter 20, three first digits	ICD-10, chapter 20, digits 4 and 5
Denmark [1)]	About 100%	About 100%	50%?
Finland [2)]	About 100%	About 100%	94% [2)]
Norway [3)]	About 100%	About 100%	42%
Sweden [4)]	About 100%	About 100%	50%?

1) Information from Birthe Frimodt-Møller, National Institute of Public Health, for digits 4 and 5 accurate percentage was not obtained from National Board of Healh.
2) Information from Anne Lounamaa, STAKES. Digits 4 and 5 are replaced with one digit for accident type (described in section above).
3) Fatalities 2000 (Statistics Norway, 2002).
4) Information from Lars Gunnar Hörte, Karolinska Institute.

For the fatalities, the diagnosis codes and the three first digits in chapter 20 (the previous E-code in ICD-9) is filled in with a sufficiently high completeness. For the fourth and fifth digits, however, the completeness is far less than wanted. Routines should be established for returning death certificates that lack information to the reporting physicians for an adequate filling in of chapter 20.

Table 2. Completeness of codes relevant for injuries and accidents for in-patients in national discharge registers in the Nordic countries. (-: not used)

Country	ICD-10, Chapter 19	ICD-10, chapter 20, three first digits	ICD-10, chapter 20, digits 4 and 5	NCECI (short)
Denmark [1)]	About 100%	-	-	90%
Finland [2)]	About 100%	90%	65% [2)]	-
Norway [3)]	About 100%	30%	5%	-
Sweden [4)]	About 100%	about 95%	5%?	-

1) Information from Birthe Frimodt-Møller, National Institute of Public Health.
2) Information from Anne Lounamaa, STAKES. Digits 4 and 5 are replaced with one digit for accident type (described in section above).
3) Sjølingstad et al., 1999.
4) Information from Lars Gunnar Hörte, Karolinska Institute and Lars Berg, National Board of Health.

Here too we see that medical codes have high completeness, while chapter 20 is less filled in. When physicians are about to fill in the data of chapter 19 and 20 in the case record, the patient has most often left the hospital. The relevant information required for filling in chapter 20 is mostly not available, and hence not recorded in the case records. In Norway, it is proposed to let ambulance personnel and receptionists register the relevant data and to include it in the records for the injured patients.

Table 3. Completeness of codes relevant for injuries and accidents in the daily routines for out-patients (accident and emergency departments) in the Nordic countries (-: not used).

Country	ICD-10, chapter 19/ICPC	ICD-10, ch. 20, three first digits	ICD-10, ch. 20, digits 4 and 5	NCECI (short)	MDS
Denmark [1)]	About 100%	-	-	95%	-
Finland [2)]	About 100%	-	-	-	-
Norway [3)]	About 100%	-	-	-	Some municipalities
Sweden [4)]	About 100%	10%?	10%?	-	-

1) Information from Birthe Frimodt-Møller, National Institute of Public Health.
2) Information from Anne Lounamaa, STAKES.
3) Lund et al., 2003.
4) Information from Lars Gunnar Hörte, Karolinska Institute.

The medical codes have high completeness, while chapter 20 is not in use or has relatively low completeness. In Denmark, there is a relatively high reporting with a short version of NCECI.

In Norway, some general practitioners register an injury MDS in their electronic journal. When a patient is given a predefined ICPC-code (see Appendix A), an extra window opens in which the relevant injury and accident codes plus free text can be recorded, see Appendix (Grimsmo and Johnsen, 1999; Lund, 2002; Lund et al., 2003). It is not known if similar registrations occur in the other Nordic countries.

Sentinel systems

Sentinel systems require extra economic and personnel resources for registration of the required data. Such systems based on NCECI (with product codes included) were introduced in the Nordic countries in the 1980s. For the time being the situation is as follows:

In Denmark, the complete NCECI (with product codes included) is recorded in five hospitals for in- and out-patients, all injuries, covering a representative sample of about 15% of the population. In addition, in the county of Funen (5% of the population), injuries are recorded with the same classification in more or less the same detail.

In Finland, no sentinel system is present.

In Norway, a sentinel system in four towns (in- and out-patients – all injuries with the complete NCECI) covering about 8% of the population was running since 1990. Three years ago, it was reduced to two towns. Today, the funding of the sentinel system has stopped. The local hospitals are now looking for regional financial sources. The future for the Norwegian system is pending.

In Sweden, there is a sentinel system covering home and leisure accidents for 5% of the population. This is planned to expand to cover 10% of the population and include all injuries (from 2004). In addition, there are systems covering all injuries in cities of Stockholm and Umeå, and in the county of Västergötaland, covering 20% of the Swedish population.

Conclusion

For the moment, there seem to be two different strategies in the Nordic countries with regard to the development of injury registration in the health care system:

1) Denmark and Sweden (and Iceland): Nationwide monitoring of injuries using Minimum Data Sets of comprehensive classifications (NCECI and ICD-10) in the routine registration for in- and out-patients, and sentinel systems using the comprehensive classification, NCECI, including product codes.

2) Finland and Norway: An abbreviated chapter 20 (ICD-10) and/or Minimum Data Sets in the routine for in- and out-patients and at some GPs, no sentinel systems.

Appendix

Some data elements and codes in the Minimum Data Set to be collected from GPs, OHPs, EDs, hospitals and death certificates in Oslo

(A) ICPC is the International Classification for Primary Care (Lamberts and Wood, 1987). It is developed by the World Organisation of National Colleges, Academies, and Academical Associations of General Practitioners/Family Physicians (WONCA) in close collaboration with the World Health Organization (WHO). The following ICPC-codes are

defined as injuries (Grimsmo and Johnsen, 1999 – P77 attempted suicide and Z25 assault are added):

(a) Fracture (all types)	L72-L76
(b) Sprain and strain, dislocation	L77-81, L96
(c) Concussion, other head injury without fracture	N79,80
(d) Eye injury, foreign body included	F75,76, F79
(e) Laceration/cut and animal/human bite	S13, S18
(f) Burns, scalds	S14
(g) Superficial skin injury, incl. insect bite	S12, S15-17, S19, H78
(h) Poisoning	A84, A86
(i) Other or multiple injuries	A80-81, A88, A96, B76-77, D79-80, H76-77, H79, N81, P77, R87-88, U80, X82, Y80, Z25

(B) ICD-10 is the tenth version of International Statistical Classification of Diseases and Related Health Problems, maintained by WHO (1992). It consists of 20 chapters, two of them are relevant for injuries:

(B1) Chapter 19 classifies the nature of injuries. There still is some discussion internationally regarding the definition of injury (Langley et al., 2002). For the purpose in Oslo, injuries are defined as the health events coded from S00 – T78 (the complication codes T79-T88 and sequelae codes T90-98 are excluded).

(B2) Chapter 20 classifies the external cause of injuries. This chapter seems so detailed and complicated, that some countries, such as Finland and Norway have made modified (abbreviated) versions. In the Norwegian version (National Health Inspectorate, 1996) the main groups are (number of categories within each group in parenthesis):

(a) Transport accidents (16)	V01 – V99
(b) Other accidents (18)	W00 – X59
(c) Intentional self-harm (1)	X6n (=X60-69)
(d) Assault (1)	X8n (=X85-99)
(e) Event of undetermined intent (1)	Y1n (=Y10-34)
(f) Legal intervention, operation of war and civil insurrection (1)	Y3n (=Y35-39)

(C) Intent (ICD-10-codes in parenthesis):

(a) Accidental injury (V01 – X59)
(b) Intentional self-harm (suicide, attempted suicide – X6n)
(c) Assault (interpersonal violence – X8n)
(d) Other (legal intervention, operation of war and civil insurrection, undetermined Y1n and Y3n)

(D) Place of occurrence (compatible with the 4th digit in ICD-10, Chapter 20, Norwegian version):

(a) Home, including garden and out buildings
(b) Nursing home
(c) Farm, excluding home
(d) Road, street, traffic accident (with moving vehicle involved)
(e) Road, street, excluding traffic accident
(f) Kindergarten with playground
(g) Other playground
(h) School and schoolyard, excluding sports area and gymnasium
(i) Sports and athletics area, gymnasium

(j) Countryside, water, sea
(k) Other (industrial/construction, commercial, restaurant etc.)

(E) Activity (compatible with the 5th digit in ICD-10, Chapter 20, Norwegian version):
(a) Work for income, also as self employed, excluding travel for work
(b) Education, including school sports, compulsory service (military)
(c) Sports, exercise, excluding professional sports
(d) Other (leisure, play, etc.)

(F) Severity is adopted from Abbreviated Injury Scale (AIS) (AAAM, 1991):
(a) First aid treatment, including by medical doctor
(b) Minor (AIS 1)
(c) Moderate (AIS 2)
(d) Severe (AIS 3-5)
(e) Fatal (AIS 6)

Poisonings are included in the severity scale, proposed by a working group of medical doctors. Some examples of the injuries in each category are seen on the window in the electronic journal for guiding the physician in the decision of which code to use.

(G) The narrative is a free text description of the accident and injury event with maximum of 150 digits. The following questions sometimes appear in the window in the electronic journal:
(a) What did you do when the accident happened?
(b) How did the accident occur?
(c) What went wrong?
(d) How did you get hurt?

(H) Last physician contact for same injury
(a) Not treated earlier
(b) Hospital
(c) Municipality ED
(d) Local ED
(e) Other medical doctor in Oslo
(f) Other medical doctor outside Oslo

(I) Referred to treatment at other places
(a) No further treatment
(b) Municipality ED
(c) Hospital in Oslo
(d) Other hospital
(e) Other health institution.

References

AAAM, Association for the Advancement of Automotive Medicine, 1991. Abbreviated Injury Scale. Morton Grove, Illinois.

Grimsmo, A., Johnsen, K., 1999. Data-assisted review of medically treated injuries in general practice. European Journal of General Practice 5, 59-65.

Lamberts, H., Wood, M., (Eds.), 1987. ICPC, International Classification of Primary Care. Oxford University Press, Oxford.

Langley, J., Stephenson, S., Cryer, C., Borman, B., 2002. Traps for the unwary in estimating person based injury incidence using hospital discharge data. Injury Prevention 8, 332-337.

Lund, H., 2002. Recording of injuries in a small community by a general practitioner. In: Lund, J., Beier, R.M., Olsen B.O., (Eds.): Injury registration for monitoring and prevention: Experiences and challenges. Directorate for Health and Social Affairs, Oslo, pp. 65-71. (Available at www.safecommunity.no/cparticle55892-8188b.html).

Lund, J., Beier, R.M., Olsen, B.O., (Eds.), 2002. Injury registration for monitoring and prevention: Experiences and challenges. Directorate for Health and Social Affairs, Oslo. (Available at www.safecommunity.no/cparticle55892-8188b.html).

Lund, J., Bjerkedal, T., Gravseth, H.M., Vilimas, K., Wergeland, E. 2003. A two-step medically-based injury surveillance system – experiences from the Oslo injury register. Submitted for publication.

National Health Inspectorate, 1996. Den internasjonale statistiske klassifikasjonen av sykdommer og beslektede helseproblemer. 10 revisjon. (ICD-10, Norwegian version). Statens helsetilsyn, Oslo.

NOMESCO, Nordic Medical Statistical Committee, 1984, 1990, 1997. Classification of External Cause of Injuries. NOMESCO, Copenhagen.

Nordic Councils of Ministers, 1978. Reporting of home and leisure accidents (In Swedish with English summary.) Report NU B 1978:14, Copenhagen.

Sjølingstad, A., Alvær, K., Engeland, A., Forsén, L., 2001. Skaderegistrering ved hjelp av ICD-10 ved norske sykehus. (In Norwegian with English abstract.) Tidsskr Nor Lægeforen 121, 1052-1054.

Statistics Norway, 2002. Dødsårsaker 2000. (Cause of Death 2000 – in Norwegian with English abstracts.) Statistisk sentralbyrå, Oslo.

WHO, World Health Organization, 1992. International Classification of Diseases and Related Health Problems: Tenth Revision: Volume 1, tabular list (ICD-10). World Health Organization, Geneva.

WHO, Working Group of Injury Surveillance Methods, 2002. International Classification of External Causes of Injuries (ICECI): Data Dictionary, version 1.1. Consumer Safety Institute, Amsterdam. (Available at www.iceci.org).

Deaths Due to Terror Acts - Coding the external cause for statistical purposes

Pnina Zadka

Background:

The Collins dictionary [1] defines "terror" as:

1. Great fear, panic, or dread
2. A person or thing that inspires great dread

The US legal definition of **terror**: Alarm; fright; dread; the state of mined by the apprehension of hurt from some hostile or threatening event or manifestation; fear caused by appearance of danger. In an indictment for riots at common law, it must have been charged that the acts done were " to the terror of the people". An element of offense of aggravated kidnapping is any act, which is done to fill with intense fear or to coerce by threat or force [2]. The same source defines **Act of terrorism:** An activity that involves a violent act or an act dangerous to human life that is violation of the criminal law of the United States or of any state; or that would be a criminal violation if committed within the jurisdiction of the United States or of any state; and appears to be intended to intimidate or coerce a civilian population; (ii) to influence the policy of the government by intimidation or coercion, or (iii) to affect the conduct of government by assassination or kidnapping [2].

The term terrorism as perceived by most countries' jurisdiction systems and international laws, refers to premeditated, politically motivated violence perpetrated against civilian targets by sub-national groups or clandestine agents, usually intended to influence an audience in order to achieve political changes. This term distinguishes terror from other forms of guerilla war or non-violent protest strikes of civilian acts, by the target and the mode of action. Guerilla war targets are military and/or other official government and law enforcement agencies. Protest strikes do not use intimidating violence and therefore shouldn't be defined as war. This perception is also in accordance with the Geneva and Hague Convention, which accepts the basic principal that the deliberate harming of

soldiers during war is a necessary evil whereas a deliberate targeting of civilians is a war crime.

Is “one man’s terrorist another man’s freedom fighter”? Sure it is! Also in other forms of war, “one man’s oppressor is another man’s liberator”. But this does not change the fact that it is **war** and should be classified as **war,** for the casualties of the “oppressors” and for the casualties of the “liberators”. These deaths should not be classified as an “assault” also from the prevention perspective; diverse modes of prevention action are needed for assault and terrorism.

Terrorism is different from other criminal acts in the same way as other modes of war are different from criminal acts. Terrorism is therefore a mode of war different from Guerilla war. Terrorism is aimed to achieve political, ideological and religious, (national or international) changes like other wars, and their main targets for actions are to intimidate ordinary civilians in order to impose changes in government actions.

The twentieth century witnessed great changes, in the use and practice of terrorism as a tactic to achieve political aims. Terrorism became the hallmark of a number of political movements stretching across the whole political spectrum. Technological advances, which on one hand reduced the volume and on the other hand increased the destructive power of different kinds of warfare, enabled more efficient concealing of warfare substances possession. Terror activity has been intensified with the expansion of communication and media coverage, and became the preferred mode of action by numerous political groups.

Classification of Injuries:

The International Classifications of Diseases, current and previous editions, devoted a special chapter for injuries due to external causes resulting from war operations. The classification combines war and other civil insurrections under the same category. The

causes in the chapter are sub-categorized by "type of weapons/warfare" causing the injury. The chapter does not enable differentiation by "type of war".

One of the purposes of the external causes categories is to enable and promote prevention programs. The lack of this sub-categorization reduces the usability and forces local solutions that may not be internationally comparable. Denial of countries' needs, for such sub-categories prevented the estimation of human loss due to these phenomena as well as international comparisons. Terrorism as a type of war is becoming the practice rather than the exception in the post WWII era. Ignoring the need by the international agency responsible for classification of deaths is ignoring the obvious.

In the last decades, almost all countries in the world suffered casualties from terror activity, developed countries as well as developing countries. Countries may define these actions as terror or otherwise, depending on internal political issues. The classification should enable the statistical system to have a unified definition that will not "label" the incident but will describe it in such a way that would clarify the coding procedure.

Israel's statistical system was confronted with the need of estimating these deaths about 20 years ago, a few years after such activities caused fatal casualties on more than one occasion. National statistical offices have to respond to local needs and requests sent by the Israel's Central Bureau of Statistics (ICBS) to the WHO classification division were not answered. Israel had, therefore, to come up with a code, which would enable coding these deaths uniquely and still maintain easy categorization into broader categories. The ICBS considered these actions as a mode of war (or civil insurrection). A new code was added to the "Injuries due to operation of war" chapter. Because the death database in Israel allows for a six digits code, there was no problem in adding a fourth and fifth digit to one of the war codes in the ninth ICD revision.

The code was added to E998 (Injury due to war operations but occurring after cessation of hostilities). The following codes were added, and WHO was notified.
E998.0 – deaths due to terror action

The type of "warfare" was sub-categorized by an extra digit.

E998.00 – bomb - blast - explosion – " suicide bomber"

E998.01 – snipers

E998.02 - careless handling of explosive

E998.03 – injury to perpetrator

E998.04 – mines

E998.06 – shot down aircraft

E998.09 - other and unspecified

E998.9 - Injury due to war operations but occurring after cessation of hostilities.

At the time this sub-categorization had answered the needs and the possibilities. Israel had raised the need to introduce a special code for these fatalities at different international meetings, but the request was always opposed, with different arguments depending on the respondent.

With the introduction of the tenth revision of ICD (1998 in Israel) there was a need to add codes for the terror fatalities again, as these events did not stop.

Again we thought the proper solution would be to add an extra code to the "War Operations" chapter and we have added the code **-Y37** – with subcategories as we thought would answer Israel's needs. This was prior to the "September 11" event. After the "September 11" the US was also confronted with the need for a special code for the fatalities and nonfatal injuries from that event.

The main debate is, who will decide whether an event is a terror action or criminal act. As in other cases of war I would assume, that the same authorities that define a specific event as "war" would decide on this as well. No one doubts that a country is sovereign to decide about what is war. If we agree that terrorism is a mode of WAR, then countries will be sovereign to define these actions as well. Nevertheless the definition should be clear and exclusive to avoid confusion and misclassification.

Suggestions for Modification of the Classification in ICD-10

The head of collaborating centers have suggested that the US add the code in the "U" chapter, which is a general chapter for national modification and countries may use it for their own needs. Israel had agreed for the time being to use the same codes as the US. The problem is that currently only the US and Israel are using these new codes. These will prevent proper international comparison on this category, as it would have different meanings for different countries. As long as the new codes are not a WHO recommendation, countries may choose to define this cases in any way they choose. This will no doubt distort international comparisons.

The EU is currently proposing a legal definition for "terrorism" for the member states. This definition will become effective only after it has been approved by all member states. Six of the EU member states have already a legal definition. When the definition will be approved it will become obligatory in each of the member states. It is expected that the process will take some time and the definition will most probably be altered before it is finalized legally [3]. If EU countries adopt the suggested definition, corresponding changes in the classification will be more likely to be accepted.

Now, that many countries in the world, developed as well as developing, including the EU countries, have experienced some form of such events, international cooperation for statistical purposes is essential.

I recommend that the ICE group re-think the issue, and propose to the WHO to modify the "WAR OPERATION" chapter to include three different types of war:

1. "Traditional war"- war between official/ordinary armed forces
2. Guerilla - civilian and pseudo-military groups targeting against government, military and other law enforcement agencies
3. Terrorism – civilian and pseudo-military groups targeting **mainly** at civilians.

Each of these main categories will be then subdivided by type of warfare, similarly to the current sub-grouping in ICD-10, with some extra sub-codes as proposed by the US in their "U01-U02" [4].

References:

[1] The Collin's English Dictionary, 1998, Harper Collin's

[2] Black's Law Dictionary, Sixth Edition

[3] http://www.wired.com/news/conflict/0,2100,48807,00.html

[4] www.cdc.gov/nchs/about/otheract/icd9/appendix1.htm

Comments

- This is a political issue. In some countries classifying these deaths other than assault will interfere with the prosecution of the perpetrators process.
- The European Community is now discussing the adoption of a new juridical definition of terror,

PoisonICE Update

Bob Flanagan and Clare Griffiths

Introduction

In adolescents/adults most acute poisoning (a single episode of poisoning or several related episodes that present as a single incident) is the result of deliberate self-poisoning (suicide/parasuicide, drug abuse, etc.) whereas in children most episodes are accidental poisoning or poisoning by someone else.

Injury and poisoning are treated together in the ICD as both have an external cause such as accident, suicide, homicide, etc., as well as a secondary cause or nature of injury - many toxicologists are confused by this and feel that useful toxicological information is lost when poisoning data are presented using the ICD framework. However, prevention must tackle the underlying cause of the poisoning hence it is important to gather the 'external cause' information. There are also further public health issues including estimation of treatment resources based on number and severity of cases and on treatment requirements such as provision of stocks of antidotes.

PoisonICE: The Way Ahead

Toxicology is poisons-oriented hence there is a need to access poisoning information by poison as well as by underlying (external) cause. Moreover, with unusual poisons, rare presentations, and/or novel treatments, more information than usually given for well-known poisons is needed to make sense of the data.

Fatal and non-fatal poisoning are different entities as regards gathering poisoning data.

Non-fatal poisoning

Poison Control Centre (PCC) calls (telephone or electronic) are a major source of data on non-fatal poisoning. PCCs have well-researched system for recording case data by:

Compound(s)
Severity/outcome
Treatment
[Underlying cause]

So far the system is available in English, French, Spanish, and Portugese, and is being translated into Chinese, Russian and possibly Arabic. More information is to be found at:

http://www.intox.org/default.html

At the moment access requires a log-in code but I could enquire whether ICE participants can be given codes if individuals would like to explore this in more detail.

ICECI also has a section on classification of poisoning for use in emergency departments, etc.

Fatal Poisoning

Most acute poisoning deaths occur outside hospital hence are not reported to PCCs. However, many countries have a central system that records poisoning deaths based on ICD codes allocated as a result of coroner/medical examiner investigation of the death. Poisoning deaths tend to be investigated much more thoroughly than non-fatal poisoning with regards to analytical evidence of the nature and magnitude of exposure, i.e. in many if not all cases detection, identification, and measurement of poisons present in tissue samples, most usually blood, from the deceased will have been undertaken. There are especially important public health implications as regards underlying cause of fatal poisoning (suicide, substance abuse-related deaths, external cause in children, occupational poisoning, etc.).

Classifying acute poisoning deaths is simpler than classifying non-fatal poisoning episodes because the poisons implicated are often known with relative certainty and severity, treatment, and outcome are not issues.

It is not really important to attempt to assign a principal poison when two or more compounds are mentioned on death certificates as the likely fatal poison can usually be inferred from what is already known about the toxicology of the compounds reported, except with new/unusual poisons or unusual circumstances as discussed above.

Improving Access to Fatal Poisoning Data

Fatal poisoning data is used in three main public health areas:

Suicide prevention
Accident prevention
Substance abuse prevention

There is an absolute requirement to study acute poisoning only and ensure all such deaths certified are counted - this has often not been done consistently because of incomplete understanding of ICD coding rules and different application of the coding rules in different countries, and different ways in which the data have been collated and presented.

There is a need for clear terminology with respect to substance abuse-related poisonings. Use of the term ‘drug deaths’ overestimates drug abuse-related deaths (for example it includes suicides from drugs such as tricyclic antidepressants), but underestimates acute poisoning deaths (for example deaths from carbon monoxide and ethanol and volatile

substance abuse-related deaths are excluded). Reporting 'illicit drug deaths' may also be unhelpful if taken to represent substance abuse-related deaths as a whole as there is a need to study deaths related to methadone and other drugs used in treatment of drug addiction as well as illicit substances.

An aim of PoisonICE is to achieve consistency and clarity of presentation of fatal poisoning data between years/organizations/countries.

Common pitfalls in collating poisoning data in ICD-9/10

1. Substance abuse-related deaths are often under-represented in fatal poisoning statistics based solely on external cause codes. This is because if drug dependence or addiction is mentioned on the death certificate the death should be coded to ICD-9 304 or 305 (ICD-10 F10-F19) rather than an external cause code under ICD coding rules. In addition volatile substance abuse-related deaths may be recorded as traumatic deaths if the immediate cause of death was a fall whilst intoxicated, or asphyxia if the deceased was found in association with a plastic bag or had choked after inhaling vomit.

2. Recording opioid-related deaths using ICD-9/10 can be problematic. An opioid is a compound that has agonist activity at opioid receptors in the brain. Many such compounds are opiates (for example heroin, morphine, and codeine) that are derived from opium, and hence are associated with many deaths worldwide every year. Some synthetic opioids such as methadone and pethidine are not derived from opium hence are not opiates, although they are classified as opiates in the ICD. This does not really matter from the point of view of recording opioid-related deaths, except that dextropropoxyphene, a potent opioid structurally related to methadone and a very common cause of fatal poisoning in the UK, is classified separately and thus omitted from opiate/opioid poisoning data based on the ICD code for opiates.

3. ICD-9/10 do not facilitate access to cases involving specific poisons if another poison in addition to alcohol (ethanol) from a different ICD grouping is mentioned on the death certificate because they are coded to a non-specific code (T50.9 in ICD-10). Conversely, it is not easy to derive data on fatal poisonings that do involve alcohol if any other compound is also mentioned on the death certificate, as these deaths are coded to the drug rather than ethanol under ICD coding rules.

4. The ICD is relatively poor on recording rare/unusual/new poisons as the coding system lacks the fine detail necessary to document such compounds separately, but these are often the compounds of considerable interest. Examples of such compounds include MDMA (ecstasy), selective serotonin reuptake inhibitors (SSRIs), and herbal/ethnic medicines. ICD-10 is an improvement on ICD-9 in this respect, as long as secondary cause (T codes) are used in addition to the underlying cause of death codes. However, some specific drugs are still not identified separately, an obvious example being MDMA. A flexible system is needed to permit recording of data on all (groups of) poisons mentioned on death certificates + other relevant information (age, sex,

underlying cause) in a dynamic database as has been done in England and Wales since 1993 (see Reference 1 for more information on the operation of this database).

Conclusions

1. Some further refinement or addition to the ICD is needed when gathering and collating fatal poisoning data if such data are to be used to generate useful information on the poisons involved. Use of a system such as the ONS drugs database (in which all drugs mentioned on death certificates are recorded electronically) in conjunction with the ICD (supplemental system) is one possible way forward. However for this to be useful internationally agreed terminology for the thousands of different poisons/combinations of poisons that may be encountered would be needed.

2. Use of a coding system based on the IPCS INTOX poison classification scheme is a further possibility - this scheme is very good for recording information on rarer compounds, animal poisons, etc. IPCS would welcome extended use of their system, but work would be needed to transform the current classification system into a true coding system.

3. Chemical Abstracts Service (CAS) numbers might also be considered as the basis for a classification system where poison(s) known, and scientific names could be used where an organism is known, etc. However, the system would have to be able to cope with some unknown poisons as well! Caution would be needed in the use of CAS numbers as, for example, different salts and racemates, for example, have different numbers to the parent compound although the use of 'intelligent' software could help here.

4. Use of the Anatomical Therapeutic Chemical (ATC) therapeutic drug classification system maintained by the WHO Collaborating Centre for Drug Statistics Methodology in Oslo, Norway (http://www.whocc.no/atcddd/) is inappropriate as only therapeutic drugs are covered hence illicit drugs and other poisons such as carbon monoxide (the major single cause of fatal poisoning in many countries) are excluded.

5. In any proposed supplemental system the ability to group/ungroup poisons present according to the reason for the data analysis (e.g. prescription drugs, illicit drugs, antidepressants, etc.) would be very important. If poisons were recorded as chemical entities then grouping for specific purposes (e.g. study of antidepressant-related deaths, analgesic-related deaths, etc.) would be relatively straightforward.

6. It would be valuable to record the mechanism of death (e.g. liver failure from paracetamol, inhalation of vomit, etc.) and route(s) of exposure if known. To this end there is a need to encourage coroners, etc. to be as specific as possible in providing the necessary information given that anonymity of the individuals concerned must be preserved in any publications.

7. If it were decided to introduce a drugs and poisons supplement to ICD-10 a 'tool-kit' with rules as to how to use the new system and to produce data in a standardised form (e.g. agreed compound groupings for specific purposes) would be needed.

The Way Ahead?

1. Propose to make annual update of fatal poisoning tables published in *Forensic Science International* (Flanagan & Rooney, 2002) available on the ICE website.

2. Further tables on poisoning in childhood in preparation and again propose that updates be posted on the ICE website.

3. We would be interested if other countries with comparable data were willing to make them available so that we can start to look at issues of comparability between countries, and possibly construction of further summary tables/figures.

4. A pilot project of a possible supplementary system with a small data-set should be considered. The Institute of Environmental Science & Research (ESR), New Zealand are developing a national chemical injury surveillance database and this might make a suitable test bed for a supplementary system.

References

1. Flanagan RJ, Rooney C. Recording acute poisoning deaths. Forensic Sci Int 2002:128;3-19.

2. Lahti RA, Vuori E. Fatal alcohol poisoning: medico-legal practices and mortality statistics. Forensic Sci Int 2002;126:203-9.

3. Landen MG, Castle S, Nolte KB, Gonzales M, Escobedo LG, Chatterjee BF, Johnson K, Sewell CM. Methodological issues in the surveillance of poisoning, illicit drug overdose, and heroin overdose deaths in new Mexico. Am J Epidemiol 2003;157:273-8.

Annex 1 - Tables to be updated and made available on the ICE website

1. Suicide/fatal poisoning: England & Wales 1950-99

	ICD-6	ICD-7	ICD-8	ICD-9
Suicide (see Note below)	E970-E979	E970-E979	E950-E959 E980-E988	E950-E959 E980-E988 except E988.8
Fatal poisoning	N960-N979	N960-N967	N960-989	960-989
Poisoning suicides	E970-E973	E970-E973	E950-E952 E980-E982	E950-E952.9 E980-E982.9

2. Suicide: England & Wales, 1956-99 (ICD: as Fig. 2)
3. Deaths due to carbon monoxide poisoning: England & Wales 1956-99 (ICD-6: N968, ICD-7: N968, ICD-8: N986, ICD-9: 986)
4. Fatal poisoning: England & Wales, 1979-99 [ICD-9: 960-989 all poisonings, 965 analgesics, 986 carbon monoxide (CO), 969.0 antidepressants, 980 alcohol, 967 sedatives and hypnotics]
5. 'Analgesic' deaths: England & Wales, 1979-99 [ICD-9: 965 analgesics, 965.0 opiates, 965.1 salicylates; manual search and ONS drugs database (dextro)propoxyphene and paracetamol] (* No data for 1981 for paracetamol and for propoxyphene because of industrial action by Registrars of Births and Deaths)
6. Paracetamol-related deaths: England & Wales, 1969-99 (manual search, substances recorded on coroner's certificate and ONS drugs database) (* No data for 1981 because of industrial action by Registrars of Births and Deaths)
7. Fatal poisoning, age <10 yr: England & Wales, 1968-99 (ICD-8: N960-989 all poisonings, N986 carbon monoxide (CO), N987 'other gases, fumes & vapours', N960-979 drugs; ICD-9: 960-989 all poisonings, 986 carbon monoxide (CO), 987 'other gases, fumes & vapours', 960-979 drugs)
8. Fatal poisoning, drug abuse: England & Wales, 1979-99 (EMCDDA definition: ICD-9: 292, 304, 305.2-9, E850.0, E854.1-2. HO definition: manual search of deaths with underlying cause 292, 304, 305, or secondary cause 960-979 for mention of controlled substance on coroner's certificate. ONS definition: ICD-9: 304, 305.2-9, 965.0, 965.8, 967, 968.5, 969, 977.8-9)

9. Fatal poisoning, dependent/non-dependent abuse and related codes: England & Wales, 1979-99 (ICD-9: 292, 304, 305.2-9, E962.0)
10. Heroin-related deaths (drug abuse, dependence or poisoning deaths where heroin and/or morphine recorded on the death certificate): England & Wales, 1993-9 (ONS drugs database)
11. Methadone-related deaths (drug abuse, dependence or poisoning deaths where methadone recorded on the death certificate): England & Wales, 1993-9 (ONS drugs database)
12. Fatal poisoning: controlled drugs other than heroin and methadone, England & Wales, 1993-9 (ONS poisons database)
13. VSA-Related sudden deaths: UK, 1971-99 (data from http://www.sghms.ac.uk/depts/phs/vsamenu.htm)
14. VSA-Related sudden deaths: UK, 1971-99 by age group (see above)
15. VSA-Related sudden deaths: UK, 1982-99 by product abused (see above)

Note

1) In routine statistics, ONS defines suicides as deaths from suicide and deaths from 'injury undetermined whether accidentally or purposely inflicted'. It is likely that most of these latter deaths are cases where the harm is self-inflicted but there was insufficient evidence to prove
that the deceased deliberately intended to kill themselves.

2) For suicide data for England and Wales, all deaths assigned to the code Y33.9/E988.8 are excluded if the record had a 'verdict pending' classification. This code is used to speed up death registration in cases where a coroner adjourned an inquest awaiting prosecution in a higher
court. The death could then be registered before legal proceedings had been completed. This process is known as 'accelerated registration'. Nearly all of these cases are subsequently found to be homicide and their inclusion would present an inaccurate picture of suicide mortality.